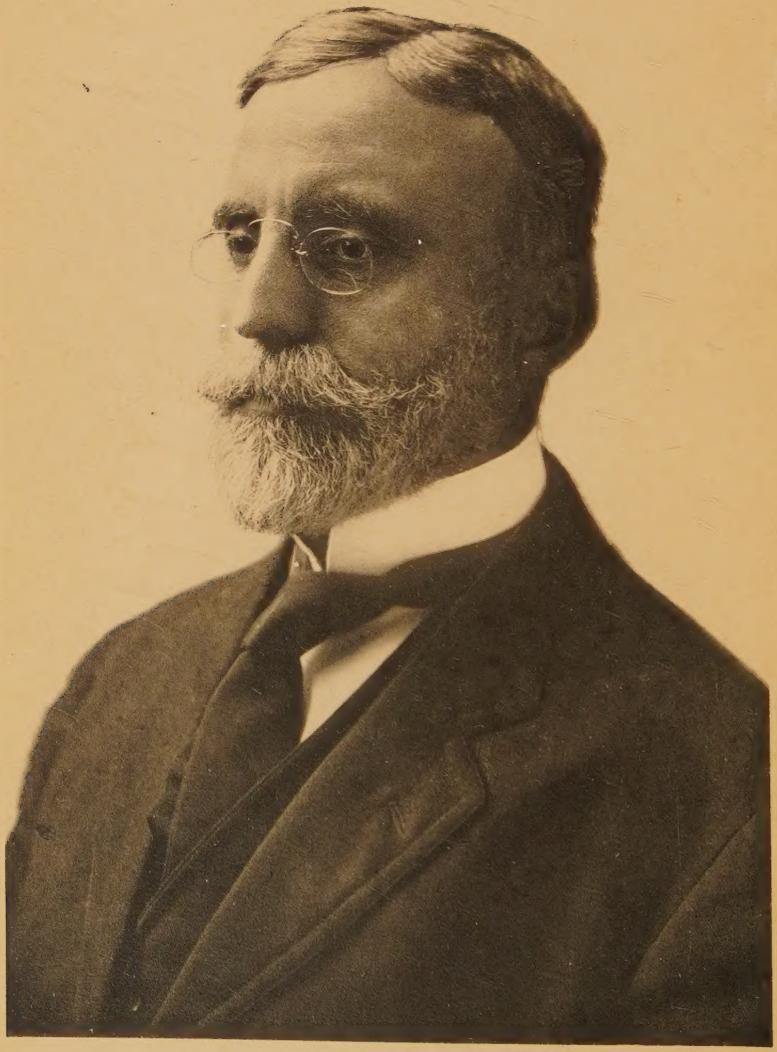

ANTHOLOGY AND BIBLIOGRAPHY
OF
NIAGARA FALLS

BY

CHARLES MASON DOW, LL.D.

Former Commissioner of the State Reservation at Niagara

VOLUME I

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CONTENTS

VOLUME I

Preface by the State Historian xi
Charles M. Dow — In Memoriam xiii
Introduction 1
Glossary of Abbreviations used for Periodicals 5
List of Bibliographies 11

CHAPTER I

Niagara Discovered: The French Period 17

CHAPTER II

Other Eighteenth Century Accounts: The English Period 53

CHAPTER III

Travelers' Original Accounts, 1801–1840 127

CHAPTER IV

Travelers' Original Accounts since 1840 229

CHAPTER V

Niagara — Historical and Reminiscent 369

CHAPTER VI

Flora and Fauna 439

CHAPTER VII

Science, Geology and Physics
Part I 495
Part II 589

VOLUME II

CHAPTER VIII

Music — Poetry — Fiction 693

CHAPTER IX

Maps and Pictures 842

CHAPTER X

Industrial Niagara 929

CHAPTER XI

Preservation of the Falls 1059

CHAPTER XII

Open Road — Guides — Railroads — Canals — Bridges 1177

Alphabetical List — Bibliography 1269

ILLUSTRATIONS

VOLUME I

Charles M. Dow ..... Frontispiece

View of the British Fall, Taken from Goat Island 16
Painted and engraved by W. J. Bennett (1831?)

The First Known View of Niagara 30
From Hennepin's "Nouvelle découverte," 1697

Elias Borne Aloft in a Chariot of Fire 60
By S. le Clerc, 1700

Niagara Cataract 90
Early French print, evidently based on Hennepin. Date uncertain, probably middle of the eighteenth century

View of Niagara 120
Published in 1751. Evidently based on Hennepin and on Kalm's description

Falls of Niagara 150
From an Italian engraving by G. M. Terreni, 1763. Evidently adapted from Hennepin

Cataract of Niagara 180
Painted by Richard Wilson; engraved by William Byrne. From a drawing taken on the spot by Lt. Pierie of the Royal Artillery, 1768

Early Print of Niagara, 1783 210
Drawn by Metz; engraved by James Heath

View of the Falls of Niagara 240
Sketched by A. Ellicott, 1790; engraved by Thackara & Vallance

A View of the Western Branch of the Falls of Niagara, Taken from the Table Rock, Looking up the River, over the Rapids 270
Painted by J. Vanderlyn; engraved by F. C. Lewis. Originally published in 1804

A Distant View of the Falls of Niagara, Including both Branches, with the Island and Adjacent Shores, Taken from the Vicinity of the Indian Ladder..... 300
Painted by J. Vanderlyn; engraved by Merigot. Originally published in 1804

View of the Great Pitch Taken from Below..... 330
Sketched by A. Wilson; engraved by George Cooke, 1810

General View of the Falls of Niagara..... 360
From a sketch by A. Wilson, 1810

Niagara Falls from the American Side..... 390
From a lithograph of a sketch by J. Milbert, 1818

Horse Shoe of Niagara from the Canadian Side..... 420
From a lithograph of a sketch by J. Milbert, 1818

General View of Niagara from the Canadian Side..... 450
From a lithograph of a sketch by J. Milbert, 1818

General View of Niagara..... 480
Early German print of a date after 1818 and based on one by Milbert

American Fall in 1827..... 510
(The Horseshoe Fall is in the distance.) Copy of sketch by Capt. Basil Hall, with camera lucida, from American shore

A Distant View of the Falls of Niagara..... 540
Painted by T. Cole, about 1830; engraved on steel by T. S. Woodcock

The Horse Shoe Fall, Niagara — with the Tower..... 570
Painted by W. H. Bartlett; engraved by P. Brandard. Published in London by George Virtue, 1837

The Rapids above the Falls of Niagara..... 600
Painted by W. H. Bartlett; engraved by R. Brandard. Published in London by George Virtue, 1837

Niagara Falls from the Ferry..... 630
Painted by W. H. Bartlett; engraved by J. Cousen. Published in London by George Virtue, 1838

Niagara 660
Painted by F. E. Church 1857. In the Corcoran Art Gallery, Washington, D. C.

VOLUME II

View of the American Fall, Taken from Goat Island.....Frontispiece
Painted and engraved by W. J. Bennett (1831?)

View of the Old Cable "Trolley" over the Rapids..... 720
(The Falls appearing in the distance)

View of the Old Suspension Bridge above the Whirlpool Rapids.. 750

View of Niagara..... 780
From a photograph taken in the seventies

Natural Condition of Prospect Point about 1875..... 810

Views of Niagara..... 840
Showing the commercial buildings as they existed in the eighties before the State took it over as a reservation

The American Falls, Goat Island and the Horseshoe Falls..... 870
Taken just below Prospect Point

The American Falls, Goat Island, and the Horseshoe (Canadian) Falls 900
Taken some distance below the Falls. The boat "Maid of the Mist" may be seen near the Horseshoe Falls

View of the East Side of the Horseshoe Falls..... 930

Airplane View of Niagara Falls..... 960
Taken from an American Army Airplane showing the Canadian or Horseshoe Falls, the American Cataract, etc.

Rapids and Gorge below the Falls..... 990

The Whirlpool.....1020
In the Rapids below the Falls

Rapids above the Falls.....1050

Rapids above the Falls.....1080

The Falls in Winter with an Enormous "Cone" of Ice Formed in Front.....1110

The Falls in Winter.....1140
Taken just below Prospect Point which may be seen in the distance with many people assembled

Falls in Winter.....1170
From a photograph. Copyrighted 1904 by O. E. Dunlap

Cave of the Winds.....1200
Beneath the Falls in winter

A Winter Scene at Niagara.....1230
Showing the effect of the frozen spray on trees in the vicinity

A Winter Scene at Niagara.....1260
Showing the effect of the frozen spray on trees in the vicinity

Part of the American Fall, from the Foot of the Stair Case.....1268
Painted by H. (*sic*) J. Bennett (1831?)

MAPS

VOLUME I

Forts and Battle Sites on the Niagara Frontier as Ceded by the Senecas to the British Crown, 1764 368

Map Illustrating Recession of Niagara Falls Showing Lines of Brink of the Falls at Different Dates 494

Section Along Niagara River from Above the Falls to Below Queenston Showing Various Levels 588

VOLUME II

New York State Reservation at Niagara 1058

PREFACE

Under the provisions of the concurrent resolution of the Senate (May 7, 1917) and of the Assembly (May 10, 1917) of the State of New York, the State Historian was asked to consider for publication Doctor Dow's "Anthology and Bibliography of Niagara Falls." After an examination of the manuscript, he was very glad to give it official approval.

In reading the numerous selections which Doctor Dow had made, he was impressed by the fact that the author had in reality compiled a veritable source book for the history of Niagara Falls. During the approximate three centuries which the work covers one is brought to realize that few men and women of national or international importance, who traveled in the United States, failed to visit the Falls and record their impressions. Foreigners from virtually all lands — Frenchmen, Englishmen, Dutchmen, Swedes, Germans, Spaniards, Italians, and a host of others have expressed their wonder and admiration of this stupendous work of nature.

Here came early explorers and travelers like Hennepin, Charlevoix, Crèvecœur, Lahontan, Lescarbot, Rochefoucauld, Liancourt, Hall, Carver and Dwight; authors, too numerous to mention, like Chateaubriand, Martineau, Dickens, Marryat, Trollope, Cooper, Hawthorne, Curtis, Parkman and Busch. Among men of our own day Howells with his delightful humor has given us inimitable sketches separated by long intervals of time; and poets like Longfellow, Arnold and Gilder, have recorded their impressions in verse or prose. Artists like Bartlett, Cole, Philoppoteaux, Vanderlyn and Church have painted its beauties; clergymen like Channing and Abbott, professors like Lieber, journalists like Rochefort, and musicians like Ole Bull have written charmingly of their sensations; engineers like

Roebling and scientists like Audubon, Agassiz, Argyll, Lyell, Tyndall have speculated upon its tremendous physical powers and the cataclysmic forces of nature which have produced it; presidents like John Quincy Adams, state governors like DeWitt Clinton, crowned heads like the Prince of Wales have in their day and turn paid it tribute. Even in what may be called a lighter vein the exploits of acrobats like Blondin entertain us with breathless interest.

Doctor Dow has truly given us not only a state document of history and science, but a book for entertainment and pleasure in prose and in verse.

JAMES SULLIVAN
State Historian

November 5, 1917

CHARLES MASON DOW

Mr Dow did not live to see the results of his many hours of labor issue from the press. During the autumn of 1920 he had not been very well and on December 10th he passed away at his home in Jamestown.

In private life Mr Dow was a banker and financier. He was in a way to the manner bred. The son of Albert Gallatin and Lydia Mason Dow, he was born in Randolph, New York, August 1, 1854. He attended the local academy there, went for two years to Oberlin College and then studied law for three years. Preferring a business career, he became a member of the banking firm of A. G. Dow and Son of Randolph and later of Dow and Company of Bradford, Pennsylvania. In 1888 he went to Jamestown and established the Jamestown National Bank, which was later merged with the Chautauqua County National Bank under the name of the National Chautauqua County Bank, of which he became president — a position which he held until his death. In 1899 he was elected vice president of the Title Guarantee and Trust Company of New York and devoted himself to that institution for some years.

Numerous other banking and private business interests engrossed his attention from time to time, but it was in the field of service to his State that his memory will always be cherished and that the commonwealth will ever find a career worthy of emulation. Of time which he might have devoted to the increase of his private fortune he gave freely and unsparingly to the State.

Always delighting in the natural beauty of forest and stream, he early became identified with that group of men of which Andrew H. Green was the center. In 1898 he was made a commissioner of the State Reservation at Niagara and from 1903 to 1914 was president of the Commission. During all those years and even after 1914, when his official connection with the

Commission ceased, his heart and soul were wrapped up in planning for the development and beautification of the Reservation. In this work the State has never had a more devoted servant or one who has given of his time and energy more willingly without monetary recompense.

At Niagara he continued the policy of his predecessors and was at one with his colleagues in eliminating any element in the landscape that could offend the eye or detract from the beauties of Nature. Ever keenly sensitive to loveliness whether in nature or art, he saw to it that every device or building that was intended for the safety and comfort of the public near the Falls was so erected and set as to blend harmoniously with the surroundings. He steadily opposed those interests which in the desire to utilize the great water power of the Falls for commercial purposes would inevitably have destroyed the beauty and grandeur of one of the world's wonders.

For many years a friend of William P. Letchworth, he was a potent factor in influencing that great philanthropist in 1907 to donate to the State as a park, the lands about the Upper Falls of the Genesee river. Mr Dow became the chairman of the committee having the park in charge and he immediately set to work with his characteristic energy, planning and thoroughness not only to preserve the park as the gem of beauty which it was by nature, but also to create there a forest arboretum — not one where merely individual specimens were shown, but where hundreds or thousands were grown in forests. In his own words: "The principle upon which the Letchworth Park Arboretum is established is that it shall consist of permanent collections of various species of the world's timber trees, likely to thrive in this northern climate, planted scientifically to test their value and illustrate the process of development, so supplying not only knowledge for knowledge's sake but also knowledge for practical use."

He was the founder of the park system of his home city of Jamestown and for many years served as president of its Park

Commission. In recognition of his services one of the city parks was named for him.

His great interest in arboriculture led him to an active participation in the work of associations devoted to such work. He was vice president of the New York State Forestry Association, trustee of the Association for the Preservation of the Adirondacks, trustee of the American Scenic and Historic Preservation Society, director of the National Conservation Association and member of many other societies and associations that have similar interests.

For his conspicuous services in the field of forestry and in connection with the Niagara Reservation, he was given the degree of doctor of laws from Bethany College in 1914 and from Niagara University in 1915.

He was elected from the fifty-first senatorial district as a delegate to the State Constitutional Convention of 1915, and Elihu Root, the chairman of the convention, selected Mr Dow as the chairman of the Committee on Conservation.

It was not alone in the field of Nature that he was active. In 1917 he was elected president of the Chautauqua County Historical Society and, as with everything that he touched, he set about to make it the best. When the law creating local historians for the towns, villages and cities of the State was passed, he spent days in going about through his county interviewing trustees, supervisors and mayors, so that at the time of his death Chautauqua county was the best organized from that point of view of any county in the State.

He was made the first vice president of the New York State Historical Association in 1919, and according to custom would have become its president in 1921. Already he was planning for a joint meeting with Canadian historical societies to the end that a steamboat might be chartered for a series of meetings on board and a trip on the St. Lawrence river. When doubt was expressed as to whether it could be done successfully he remarked: "It can be done and I am going to do it." His

whole life was marked by this kind of careful deliberation, planning and execution.

When the United States became involved in the World War, he took his share of the burdens and served as Federal Fuel Administrator for Chautauqua county, County Director of the Liberty Loan Campaigns, and as a member of the Federal Milk Commission.

In the midst of his activities as a banker and financier, and as an active promoter of the preservation of the forests and of the scenic beauties of the State, Mr Dow was able to find time to write articles for various publications and to get together material for his books: "A Century of Finance and Commerce;" "A History of the State Reservation at Niagara;" and for the volumes in which this memorial notice appears.

One of his friends has written of him:

"He touched life at more points than any other man whom I have ever known intimately; he knew minutely more of the inward life of the people, not alone of this locality, but of the country generally, than most of the philosophers. He instinctively knew, and he had a delicate appreciation for, the finer side of every person with whom he came in contact, and his kindly, though often blunt, methods of bringing men together and smoothing out the rough places, has served to preserve and perpetuate friendships which otherwise would have drifted into animosities which could not have failed to mar the life of the community. Add to these splendid qualities that charity which delights, not in ostentatious giving, but in daily doing; which appreciates that men and women need encouragement in the development of character and an abiding faith more than a fostering of their self-pity, and we have a composite picture of the man."

All his fellow citizens may well pay him tribute in the words:

"He labored that the natural beauties of his State might be preserved."

JAMES SULLIVAN

INTRODUCTION

For years it has been the desire of the Commissioners of the State Reservation at Niagara to make the park around Niagara Falls a center of information concerning the history of that great natural spectacle. Unfortunately, however, means were not available for the building up of a complete, or even extensive, Niagara Falls library on the Reservation. It is true that from the beginning the records of the commissioners have been faithfully kept and such material as has come to hand has been carefully treasured, filed and cataloged, so that the archives in the Administration Building on the Reservation are a veritable storehouse of information concerning the Reservation, the Reservation movement, and the struggle of the last thirty years for the preservation of the Falls and the surrounding scenery. The annual reports of the commissioners also abound in information of all sorts and contain many valuable articles by writers of note. But none of the material mentioned goes farther back than 1879, whereas there are some 250 years of written history of the Falls previous to that date.

The writer realized that the public libraries at Niagara Falls and Buffalo and the historical societies in both these places had accumulated a wealth of rare material, while various individuals in the vicinity had valuable collections of greater or lesser extent. He could not help feeling, however, that very few of the millions who make their hurried pilgrimage to the wonder of the western world ever trouble to avail themselves of these facilities, if, indeed, they ever dream how fascinating and old and vast the literature of the Falls is. It seemed a pity that it should be so. But how to put the quaint and often fantastic accounts by the earliest writers, the innumerable descriptions by travelers, the literary and scientific masterpieces having to do with the Falls, within reach of the sight-seeing and pleasure-seeking tourist and

interested student, was the problem. The answer is this bibliography and anthology of the Falls.

It is an attempt to make known and available at least the printed material on the subject and will amply serve the purpose for which it is written if it conveys some slight idea of the great extent of Niagara literature, inspires something more than a mere passing interest, and calls attention to the long history of the Falls and the many interesting aspects — historical, political, economic, industrial, scientific, artistic and literary — from which they may be viewed.

The author feels that his attempt is justified by the amount of the material and the extreme rarity of much of it, by the interest of the subject, the esthetic appeal of the Falls and their industrial importance, and the prominent place which the question of their preservation has occupied in local, state, national, and even international councils.

As may be imagined, the selection and arrangement of the material presented many problems. It should be pointed out in the beginning that no attempt has been made to exhaust the subject and that very little manuscript text has been included. Indeed, in view of the vast amount of Niagara material and the constant additions to it, the subject could not well be exhausted. This bibliography is the most comprehensive thus far compiled, all old titles have been included and new ones added to existing lists, the titles given having been found in public libraries of the United States. Except in the earliest period mere mention of the Falls has not been regarded. Nor have general accounts of events in the vicinity of the cataract been included unless they were written with special reference to the Falls. The book is a history not of the region but of the Falls and the material has, as far as practicable, been strictly limited to the subject in hand. If this is borne in mind apparent omissions will be explained.

It seemed to the author that the material would be most accessible and his book most usable if the titles were thrown into the form of an alphabetical list and then rearranged chronologically

and classified on the basis of the different interests or aspects from which the Falls may be viewed. He felt that in this way the history of the Falls and the development of knowledge concerning them and their use would best appear as an orderly evolution. The presentation of the subject, it need hardly be said, is essentially popular in style.

In many cases the limits of the book forbade quotation and only the most interesting and valuable bits have been taken and the selection so made as to avoid needless repetition and yet afford as much information and present the Falls from as many points of view as possible. But as the aim has been to preserve the accounts in their integrity rather than to quote mere scraps and mutilations, some repetition has been unavoidable. Extracts generally have been chosen on their own merits. It may therefore happen that comparatively unknown writers have been cited at greater length than authors of wider fame. Where extracts have not been given or where further information seemed desirable, critical estimates or short summaries have been inserted after the title. In these cases the opinion of an authority has been used wherever this was available as of more value than the author's personal judgment. No attempt has been made to exhaust or even to indicate the various editions of the books cited. Generally speaking, the first issue of the narratives has been given. In the case of the early French accounts the first English edition has been, as a rule, also indicated. Rare books have been cited in their latest and most accessible reprint.

In some cases it has been difficult to decide where a given account belonged in the chronological scheme. This was especially true of some of the reminiscent descriptions of the Falls written from memory a long time after the Falls had been viewed by the writer in question. In general, however, the early accounts have been listed in the order of the time of the visit which they describe. Where it was impossible to ascertain this, the date of publication was of course the only resort. In accounts of more recent times, especially those dealing with the industrial and

scientific aspects of the subject, the date of publication usually has been the one assigned. In these later accounts, with the multiplication of Niagara material, it has often been impossible to ascertain whether a given author was writing at first or at second hand.

The classification of the material according to subject matter has been even more difficult than its arrangement chronologically. In many cases assignment to one classification rather than to another has been of necessity more or less arbitrary.

The same may be said of the selections made. No two people would be in agreement on the material chosen for quotation. When doing work of this kind an author gets a certain point of view, which he follows, and what may appear to him as important impresses another as trivial.

While every effort has been made in the interest of accuracy and such a degree of comprehensiveness as is compatible with the object of the book, errors and omissions have no doubt occurred. The author will be glad to have these called to his attention.

It is fitting that this slight sketch of the origin, purpose and plan of this undertaking should close with some acknowledgment of the author's indebtedness to his predecessors in the field of Niagara Falls literature. Previous bibliographies have been freely used and earlier studies constantly referred to. An expression of gratitude is due to many public libraries and historical societies for their unfailing interest in the author's efforts and their frequent helpful suggestions.

CHARLES M. DOW

April 1917

GLOSSARY OF ABBREVIATIONS USED FOR PERIODICALS

Am. antiq.— American antiquarian.
Am. architect.— American architect.
Am. elec.— American electrician.
Am. geog. soc.— American geographical society.
Am. geol.— American geologist.
Am. jour. sci.— American journal of science.
Am. jour. of geol. and nat. sci.— American journal of geology and natural science.
Am. mach.— American machinery.
Am. mf. and ir. wld.— American manufacturing and iron world.
Am. maps.— American maps.
Am. month. mag.— American monthly magazine.
Am. nat.— American naturalist.
Ann. rep'ts of the com'rs of the state reserv. at Niagara.— Annual reports of the Commissioners of the State Reservation at Niagara.
Ann. rep'ts of the fourth geol. dis't of N. Y.— Annual reports of the fourth geological district of New York.
Ann. rep'ts of the Smith. inst.— Annual reports of the Smithsonian Institution.
Art jour.— Art journal.
Atlan.— Atlantic monthly.
Black.— Blackwood's magazine.
Bost. jour. nat. hist.— Boston journal of natural history.
Buff. hist. soc. pub.— Buffalo historical society publications.
Buff. soc. of nat. sci.— Buffalo society of natural science.
Brit. assn. for the A. S.— British association for the advancement of science.
Calendar of N. Y. col. mss.— Calendar of New York colonial manuscripts.
Can. dep't of mines, geol. survey branch.— Canadian department of mines, geological survey branch.
Can. eng.— Canadian engineer.
Can. geol. survey.— Canadian geological survey.
Can. jour.— Canadian journal.
Can. jour. (*Can. inst.*) — Canadian journal (Canadian institute).

Can. mag.— Canadian magazine.
Can. nat.— Canadian naturalist.
Cass.— Cassier's magazine.
Cent.—Century magazine.
Chamber's jour.— Chamber's journal.
Chaut.— Chautauquan.
Christian observ.— Christian observer.
Colburn's new mo. mag.— Colburn's new monthly magazine.
Coll. w.— Collier's weekly.
Columbian mag.— Columbian magazine.
Cosmop.— Cosmopolitan magazine.
Cur. lit.— Current literature.
Dodsley's ann. reg.— Dodsley's annual register.
Dub. rev. sci. not.— Dublin review scientific notes.
Eclec. mag.— Eclectic magazine.
Elec. eng.— Electric engineering.
Elec. rev.—Electric review.
Elec. power.— Electric power.
Elec. wld.— Electric world.
Elec. wld. & eng.— Electric world and engineer.
Electro-chem. & metal. ind.— Electro-chemical and metallurgical industry.
Eng.— Engineering.
Eng. (Lond.)— Engineering (London).
Eng. dig.— Engineering digest.
Eng. mag.— Engineering magazine.
Eng. news.— Engineering news.
Eng. rec.—Engineering record.
Every Sat.— Every Saturday.
Gentleman's mag.— Gentleman's magazine.
Geog. jour. (Lond.)— Geographical journal (London).
Geol. mag.— Geological magazine.
Geol. soc. of Am.— Geological society of America.
Graham's Am. mo. mag.— Graham's American monthly magazine.
Hamilton scientific assn. jour. and proc.— Hamilton scientific association journal and proceedings.
Harp.— Harper's magazine.
Harp. w.—Harper's weekly.
Hist. mag.— Historical magazine.
Illus. Am.—Illustrated America.
Illus. wld.— Illustrated world.
Indep.— Independent.

Internatl. q.— International quarterly.
Irish mo.— Irish monthly.
Jour. Am. hist.— Journal of American history.
Jour. assn. eng. soc.— Journal of the association of engineering societies.
Jour. Frank. inst.— Journal of the Franklin institute.
Jour. soc. arts.— Journal of the society of arts.
Jour. soc. chem. ind.— Journal of the society of chemical industry.
Jour. w. soc. eng.— Journal of western society of engineers.
Knicker.— Knickerbocker magazine.
Knowl.— Knowledge.
Ladies' home jour.— Ladies' home journal.
Leisure hr.— Leisure hour.
Leslie's w.— Leslie's weekly.
Lit. dig.— Literary digest.
Lit. liv. age.— Littell's living age.
London & Edinburgh phil. mag.— London and Edinburgh philosophical magazine.
Loudon's mag. of nat. hist.— Loudon's magazine of natural history.
Macmill.— Macmillan's magazine.
Mag. Am. hist.— Magazine of American history.
Maps of Am.— Maps of America.
Mass. hist. soc. coll.— Massachusetts historical society collections.
Mass. mag.— Massachusetts magazine.
Metal & chem. eng.— Metallurgical and chemical engineer.
Mus. for. lit.— Museum of foreign literature.
Nat.— Nature.
Nat. mag.— National magazine.
New Princeton rev.— New Princeton review.
Niagara front. hist. soc. leaf.— Niagara frontier historical society leaflet.
N. Am. rev.— North American review.
Once a wk.— Once a week.
Ontario hist. soc.— Ontario historical society.
Outl.— Outlook.
Overland mo.— Overland monthly.
Pearson's mag.— Pearson's magazine.
Penn. mag. of hist. and biog.— Pennsylvania magazine of history and biography.
Phila. med. and phy. jour.— Philadelphia medical and physical journal.
Pop. sci. mo.— Popular science monthly.
Proc. A. A. A. S.— Proceedings of the American association for the advancement of science.

Proc. Bost. soc. nat. hist.— Proceedings of the Boston society of natural history.

Proc. of Can. inst.— Proceedings of the Canadian institute.

Proc. eng. club Phila.— Proceedings of the engineering club of Philadelphia.

Proc. geol. soc. of London.— Proceedings of the geological society of London.

Proc. inst. M. E.— Proceedings of the institute of mechanical engineers.

Proc. of royal inst. of Gt. Br.— Proceedings of royal institute of Great Britain.

Pub. opin.— Public opinion.

Quarterly jour. sci.— Quarterly journal of science.

R. R. gaz.—Railroad gazette.

R. of R.— Review of reviews.

Ry. & eng. rev.— Railway and engineering review.

Rec. past.— Records of the past.

Royal.— Royal magazine.

Royal society of Canada, proc. and trans.— Royal society of Canada, proceedings and transactions.

Ry. & eng. rev.—Railway and engineering review.

Sat. mag.— Saturday magazine.

Sat. rev.— Saturday review.

Sci.— Science.

Science n. s.— Science, new series.

Sci. Am.— Scientific American.

Sci. Am. sup.— Scientific American supplement.

Scrib.— Scribner's magazine.

Scrib. mo.— Scribner's monthly magazine.

Soc. lit. miss.— Social literary miscellany.

Spec.— Spectator.

Story rev.— Story review.

St. ry. jour.— Street railway journal.

St. ry. rev.— Street railway review.

Tech. wld.— Technical world.

Trans. Am. electro. chem. soc.— Transactions of the American electro-chemical society.

Trans. A. S. C. E.— Transactions of the American society of civil engineers.

Trans. Am. inst. elec. engrs.— Transactions of the American institute of electric engineers.

Trans. Am. inst. mining engrs.— Transactions of the American institute of mining engineers.

Trans. Can. S. C. E.— Transactions of the Canadian society of civil engineers.

Trans. Edin. geol. soc.— Transactions of the Edinburgh geological society.

Trans. Am. philos. soc.— Transactions of the American philosophical society.

U. S. Cath. hist. mag.— United States Catholic historical magazine.

U. S. geol. surv.— United States geological survey.

W. elec.— Western electrician.

West. lit. mess'gr.— Western literary messenger.

Wld. today.— World today.

Wld's work.— World's work.

Yale sci. mo.— Yale science monthly.

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1893

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Supplementary to list published in the Tenth Annual Report to the Commissioners of the State Reservation at Niagara.

1896

DARTON, NELSON HORATIO. Catalogue and index of contributions to North American geology, 1732–1891. (U. S. geol. surv. Bull. no. 127. Wash.: 1896. Pp. 686–702.)

The pages cited contain all articles concerning New York state, including those having to do with the Niagara region.

1900

GRABAU, AMADEUS W. Partial bibliography of the geology of Niagara and the great lakes. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: 1900. 18:app. 130–139.)

1901

SALEM, MASS., PUBLIC LIBRARY. Reading list on Niagara. (Bulletin, June 1901. 6:2.)

Consists of fifty titles contained in the Salem Public Library on Niagara. The titles are divided according to subject.

1903

CLARK, EDITH. Niagara Falls: a partial bibliography. (Bul. bibliog., July, 1903. Vol. 3, no. 6, pp. 85–91.)

A bibliography of some one hundred fifty titles. Especially good for magazine and technical journal articles up to July, 1903. The scope of the work is sufficiently well indicated by the author. We quote: "All material on the subject is not exhausted, but I think that I may safely say that all of the best material in the Library of the University of Illinois, the Champaign Public Library, the John Crerar Library, and the Public Library at Chicago has been included."

1904

ROGERS, H. A. Niagara Falls. Bibliography. (New York state library, Albany, N. Y.: 1904.)

A manuscript bibliography.

1910

NEWS FOR BIBLIOPHILES. (Nation, Oct. 20, 1910. 91:360–361.)

The Porter collection of Niagarana with special reference to its Hennepin editions.

PORTER, PETER AUGUSTUS. A catalogue of books, pamphlets, engravings, etc., relating largely to Niagara Falls. N. p. N. d.

1913

HASKELL, DANIEL C. A partial bibliography of Niagara Falls. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany. 1913. 29:49–98.)

Classified bibliography of various aspects of the Falls: history and description, guide books, scientific aspects, bridges, industrial development, preservation of the Falls, poetry and fiction. The references cited in this list are all to be found either in the New York Public Library or the Library of Congress.

NETHERCUT, MARY BELL. Niagara Falls; a bibliography. (University of Wisconsin, Library School, Madison, Wis.: June, 1913.)

Compiled by a student of the Wisconsin Library School, Madison, Wisconsin, and " aims to include all references to Niagara Falls available in Madison, Wisconsin." The references are divided according to subject, and cover a wide range of material.

1917

CLEARWATER, A. T. List of aqua-tints of Niagara Falls. Kingston, N. Y.: 1917. (Manuscript.)

A list of fifty-two rare aqua-tints of Niagara collected by Judge Alphonso T. Clearwater, Commissioner of the State Reservation at Niagara. The artist is given when known, the publisher or printer, the date and the size of the aqua-tint.

CHAPTER I

VIEW OF THE BRITISH FALL.
Taken from Goat Island
Painted and engraved by W. J. Bennett (1831?)

Printed by L. Nagel

CHAPTER I

NIAGARA DISCOVERED: THE FRENCH PERIOD

1604

1604 Champlain

CHAMPLAIN, SAMUEL DE. Des Savvages ov, Voyage de Samvel Champlain de Brovage, fait en la France Novvelle, l'an mil six cens trois: contenant les moeurs, façon de viure, mariages, guerres, & habitation des sauuages de Canadas . . . A Paris, Chez Clavde de Monstr'oeil. (1604) pp. 42, 45–46, 47. (Œuvres de Champlain, publiées sous le patronage de l'Université Laval par l'abbé C.-H. Laverdière. Quebec: Imprimé au Séminaire par G.-E. Desbarats. 1870. Vol. I, pp. 106, 109–110, 111.)

Champlain was the first to explore Lake Ontario carefully. It was while doing this that he heard of Niagara Falls. In his capacity as geographer to Henry IV, he kept "full notes of his voyages and travels." His records are consequently invaluable. Unfortunately the original edition of the "Voyages" is very rare and expensive. The Abbé C.-H. Laverdiére's edition is an "accurate reproduction of the early texts" and altogether the best French rendering. The Prince Society's English edition is a "careful and readable translation."

CHAMPLAIN, SAMUEL DE. Voyages. Translated from the French by Charles Pomeroy Otis. With historical illustrations, and a memoir by the Rev. Edmund Farwell Slafter. Boston: Prince Society. 1878–1882. Vol. I, pp. 271, 274–276.

Then they come to a lake some eighty leagues long, with a great many islands; the water at its extremity being fresh and the winter mild. At the end of this lake they pass a fall, somewhat high and with but little water flowing over. Here they carry their canoes overland about a quarter of a league, in order to pass the fall, afterwards entering another lake some sixty leagues long, and containing very good water. Having reached

1604 Champlain the end, they come to a strait two leagues broad and extending a considerable distance into the interior. They said they had never gone any farther, nor seen the end of a lake some fifteen or sixteen leagues distant from where they had been, and that those relating this to them had not seen any one who had seen it. . . .

Then they enter a lake some hundred and fifty leagues in length, and some four or five leagues from the entrance of this lake there is a river extending northward to the Algonquins, and another towards the Iroquois, where the said Algonquins and the Iroquois make war upon each other. And a little farther along, on the south shore of this lake, there is another river, extending towards the Iroquois; then, arriving at the end of this lake, they come to another fall, where they carry their canoes; beyond this, they enter another very large lake, as long, perhaps, as the first. The latter they have visited but very little, they said, and have heard that, at the end of it, there is a sea of which they have not seen the end, nor heard that any one has, but that the water at the point to which they have gone is not salt, but that they are not able to judge of the water beyond, since they have not advanced any farther; that the course of the water is from the west towards the east, and that they do not know whether, beyond the lakes they have seen, there is another watercourse towards the west; that the sun sets on the right of this lake; that is, in my judgment, northwest more or less; and that, at the first lake, the water never freezes, which leads me to conclude that the weather there is moderate. . . .

After this, they enter a very large lake, some three hundred leagues in length. Proceeding some hundred leagues in this lake, they come to a very large island, beyond which the water is good; but that, upon going some hundred leagues farther, the water has become somewhat bad, and, upon reaching the end of the lake, it is perfectly salt. That there is a fall about a league wide, where a very large mass of water falls into said lake; that, when this fall is passed, one sees no more land on either side,

but only a sea so large that they have never seen the end of it, nor heard that any one has; that the sun sets on the right of this lake, at the entrance to which there is a river extending towards the Algonquins, and another towards the Iroquois, by way of which they go to war. 1604 Champlain

The three passages just quoted are from the Prince Society's translation. They mark the beginning of Niagara Falls literature. The allusions to the great lakes and to the Falls are unmistakable though no names are given. The accounts are far from accurate, to be sure, but this is easily explained when it is remembered that Champlain himself never saw the Falls and that his statements concerning them are based on reports made to him by the Indians in 1603.

1609

LESCARBOT, MARC. Histoire de la Novvelle France, contenant les navigations, découvertes, & habitations faites par les François és Indes Occidentales & Nouvelle-France souz l'avœu & authorité de noz rois tres-chrétiens . . . A Paris, Chez Iean Milot. 1609. Bk. II, pp. 366, 381, 383. 1609 Lescarbot

Lescarbot's *Histoire de la Nouvelle France*, 1609 edition, from the middle of page 366, in chapter XIX, near the beginning thereof, to the end of chapter XXI, on page 385, is an almost exact copy of Champlain's *Des Sauvages*, from the top of page 28 in chapter VI, to the end of chapter IX on page 48, edition 1870, volume II.

LESCARBOT, MARC. Histoire de la Nouvelle France suivie des muses de la Nouvelle France. Paris: Edwin Tross. 1866. Vol. II, pp. 339, 341, 343.

A reprint of the second edition, Paris, 1612.

LESCARBOT, MARC. The history of New France . . . with an English translation, notes and appendices by W. L. Grant . . . and an introduction by H. P. Biggar. . . . Toronto: Champlain Society. 1907. Vol. II, pp. 135, 138, 139.

The text and translation of the third edition, Paris, 1618.

1644–45

GENDRON, *Le Sieur*. Qvelqves Particvlaritez dv pays Des Hvrons en la Novvelle France Remarquées par le Sieur Gendron, Docteur en Medicine, qui a demeuré dans ce pays-la fort long-temps. Redigées par Jean Baptiste de Rocoles, Conseiller et Aumosnier du Roy, & Historiographe 1644–45 Gendron

1644–45 Gendron de sa Majesté. A Troyes, & A Paris, chez Denys Bechet, . . . et Lovis Billaine, . . . MDCLX. Pp. 7–8.

Colophon: Achevé d'imprimer á Albany, N. Y., par J. Munsell, ce 25 Aôut, 1868.

The extract quoted is from a letter written by Gendron in 1644–45.

Almost south of the Neuter Nation is a large lake, almost 200 leagues in circumference, called Erie, which is formed from the discharge of the Fresh Water Sea (Lake Huron) and which falls from a terrible height into a third lake called Ontario, which we call Lake St. Louis. The spray of these waters rebounding from the foot of certain large rocks in that place, forms a stone, or rather a petrified salt, of a yellowish color and of admirable virtue for the curing of sores, fistules, and malign ulcers. In this horrible place there dwell also certain savages who live only on the elks, stags, wild cows, and other kinds of game which the rapids carry along and cast among these rocks where they (the savages) take them without hunting in larger numbers than suffices for their needs and the entertainment of the travelers with whom they deal in these Erie stones so called because of this lake, so that they take them along and distribute them afterwards among other nations.

1647–48

1647–48 Ragueneau RAGUENEAU, PAUL. Relation of what occurred in the mission of the Fathers of the Society of Jesus in the Huron country in New France in the years 1647 and 1648. Sent to Rev. Father Estienne Charlet, Provincial of the Society of Jesus in the Province of France. By Father Paul Ragueneau of the same Society, Superior to the Huron mission. (Thwaites, Jesuit Relations, XXIII, p. 63.)

The original is in French and word for word like the Gendron description quoted above.

1653

1653 Bressani BRESSANI, FRANCESCO GIUSEPPE. A brief account of certain missions of the Father of the Society of Jesus in New France, by Father Francesco Giuseppe Bressani, of the same Society, to the most eminent and reverend signor, Cardinal de Lugo. At Macerata, by the heirs of Agostino Grisei. 1653. (Thwaites, Jesuit Relations, XXXVIII, pp. 235–237.)

The original letter was written in Italian, but the account of the Falls which it contains is very similiar to Ragueneau's. In fact, so much alike are the two accounts, that, were it not for the difference in language, one would take them for the same account. 1653 Bressani

1669

GALINÉE, RENE BREHAN DE. Exploration of the Great Lakes, 1669–1670, by Dollier de Casson and De Bréhan de Galinée. Galinée's narrative and map, with an English version, including all the map legends. Translator and editor, James H. Coyne. Toronto: the Society. 1903. (Ontario Historical Society, Papers and Records, vol. IV, pp. 38–41.) 1669 Galinée

Contains both French and English versions. French editions occur in Pierre Margry's *Découvertes et établissements des Français dans . . . l'Amérique Septentrionale*, tome I, pp. 139, and in the *Mémoires* of the *Societé Historique de Montreal*, livre VI. An English translation of the Niagara Falls portion of the narrative may be found in O. H. Marshall's *First visit of de La Salle to the Senecas made in 1669*, a paper read before the Buffalo Historical Society in March, 1874.

Galinée was a Sulpitian missionary who came to the Niagara in 1669 in the company of Dolliver de Casson and La Salle. The extract quoted is the narrative of that visit. Though only a hearsay account it is very good, much better, in fact, than some later first-hand accounts. The distances on the river are incorrect, but the report of the height of the Falls at least approximates the truth. It is interesting to notice that in Galinée occurs the first reference to the great distance at which the roar of the Falls was audible.

We discovered a river one eighth of a league wide and extremely rapid, which is the outlet or communication from Lake Erie to Lake Ontario. The depth of this stream [for it is properly the River St. Lawrence] is prodigious at this spot; for at the very shore there are fifteen or sixteen fathoms of water, which fact we proved by dropping our line. This outlet [may be forty leagues in length, and] contains, at a distance of ten or twelve leagues from its mouth in Lake Ontario, one of the finest cataracts or water-falls in the world; for all the Indians to whom I have spoken about it said the river fell in that place from a rock higher than the tallest pine trees; that is, about two hundred

1669 Galinée

feet. In fact, we heard it from where we were. But this fall gives such an impulse to the water that, although we were ten or twelve leagues away, the water is so rapid that one can with great difficulty row up against it. [At a quarter of a league from the mouth, where we were, it begins to contract and to continue its channel between two steep and very high rocks, which makes me think it would be navigable with difficulty as far as the neighborhood of the falls. As to the part above the falls, the water draws from a considerable distance into that precipice, and very often stags and hinds, elks and roebucks, suffer themselves to be drawn along so far in crossing this river that they find themselves compelled to take the leap and to see themselves swallowed up in that horrible gulf.]

Our desire to go on to our little village called Ganastogué Sonontoua Outinaouatoua prevented our going to see that wonder, [which I regarded as so much the greater, as the River St. Lawrence is one of the largest in the world.] I leave you to imagine if it is not a beautiful cascade, to see all the water of this great river, which at its mouth is three leagues in width, precipitate itself from a height of two hundred feet with a roar that is heard not only from the place where we were, ten or twelve leagues distant, but actually from the other side of Lake Ontario, opposite this mouth, from which M. Trouvé told me he had heard it. We passed this river, accordingly, and at last, after five days' voyage, arrived at the end of Lake Ontario. . . .

1669 Le Clercq

Le Clercq, Chrétien. Etablissement de la Foy dans le Nouvelle France, contenant l'Histoire des Colonies Françoises, & des Découvertes qui s'y font faites jusque à present: avec une relation exacte des Expeditions & Voyages entrepris pour la Découverte du Fleuve Mississippi jusque au Golphe de Mexique . . . sous la conduite du Sieur de la Salle . . . A Paris. Chez Amable Auroy. 1691. Vol. II, pp. 132–163.

Le Clercq, Chrétien. First establishment of the faith in New France. . . . Translated by J. G. Shea. N. Y.: Shea: 1881. Vol. II, pp. 102–126.

Although both the original and translation of this work contain only frequent allusions to Niagara in the course of the account of La Salle's explorations, with no attempt at description, on account of the early date, it seemed suitable that mention should be made of them in their proper order. 1669 Le Clercq

1678

HENNEPIN, LOUIS. Description de la Louisiane, nouvellement decouvérte au Sud 'Oüest de la Nouvelle France, par ordre du roy . . . A Paris. Chez la Veuve Sébastien Huré. 1683. Pp. 29–30. 1678 Hennepin

Father Hennepin was a Recollect missionary who accompanied the La Salle expedition of 1678. He was the first man to write of the Falls at length. His works were extremely popular and the original French was soon translated into various other European languages. The different editions are legion, extending from 1683 to the present time.

HENNEPIN, LOUIS. Description of Louisiana. Translated from the edition of 1683 and compared with the *Nouvelle Découverte*, the La Salle documents, and other contemporaneous papers, by John Gilmary Shea. N. Y.: John G. Shea. 1880. Pp. 71-72, 378-381.

Pages 378–381 are a translation of the description given in the *Nouvelle Découverte* and quoted below.

On the 6th (December, 1678), St. Nicholas day, we entered the beautiful river Niagara, which no bark had ever yet entered. . . . Four leagues from Lake Frontenac there is an incredible Cataract or Waterfall, which has no equal. The Niagara river near this place is only the eighth of a league wide, but it is very deep in places, and so rapid above the great fall, that it hurries down all the animals which try to cross it, without a single one being able to withstand its current. They plunge down a height of more than five hundred feet, and its fall is composed of two sheets of water and a cascade, with an island sloping down. In the middle these waters foam and boil in a fearful manner.

They thunder continually, and when the wind blows in a southerly direction, the noise which they make is heard for from more than fifteen leagues. Four leagues from this cataract or fall, the Niagara river rushes with extraordinary rapidity especially for two leagues into Lake Frontenac. It is during these two leagues

1678 Hennepin

that goods are carried. There is a very fine road, very little wood, and almost all prairies mingled with some oaks and firs, on both banks of the river, which are of a height that inspire fear when you look down.

This is Hennepin's first and most trustworthy description of the Falls. It is briefer and far more conservative than his later versions. According to Porter,[1] this description is "without a parallel" and "stands out as the most impressive, as well as the quaintest, brief mention of Niagara that was ever penned."

HENNEPIN, LOUIS. Nouvelle decouverte d'un tres grand pays Situé dans l'Amerique, entre Le Nouveau Mexique, et La Mer Glaciale, Avec les Cartes, & les Figures necessaires, & de l'Histoire Naturelle & Morale, & les avantages, qu'on en peut tirer par l'etablissement des colonies . . . A Utrecht. Chez Guillaume Broedelet. 1697. Pp. 44–46, 441–456.

HENNEPIN, LOUIS. A new discovery of a vast country in America, extending above four thousand miles between New France and New Mexico; with a description of the great lakes, cataracts, rivers, plants, and animals . . . London. Printed for M. Bentley, J. Tonson, H. Bonwick, T. Goodwin, and S. Manship. 1689. Pp. 24–25, 216–221, or, 29–30, 266–274.

Pages 24–25 or 29–30 contain the account most frequently quoted and perhaps best known. In it various details have been added to the earlier description and the height of the Falls has been increased to 600 feet.

HENNEPIN, LOUIS. A new discovery of a vast country in America, by Father Louis Hennepin; reprinted from the second London issue of 1698, with facsimiles of original title-pages, maps, and illustrations, and the addition of introduction, notes, and index by Reuben Gold Thwaites . . . Chicago: A. C. McClurg. 1903. Vol. I, pp. 54–55, 317–323.

After we had row'd above an hundred and forty Leagues upon the Lake *Erie*, by reason of the many Windings of the Bays and Creeks which we were forc'd to coast, we pass'd by the Great Fall of *Niagara*, and spent half a Day in considering the Wonders of that prodigious Cascade.

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[1] *Niagara an Aboriginal Trade Center*, p. 15.

I could not conceive how it came to pass, that four great Lakes, the least of which is 400 Leagues in compass, should empty themselves one into another, and then all centre and discharge themselves at this Great Fall, and yet not drown good part of *America*. What is yet more surprising, the Ground from the Mouth of the Lake *Erie*, down to the Great Fall, appears almost level and flat. 'Tis scarce discernable that there is the least Rise or Fall for six Leagues together: The more than ordinary swiftness of the Stream, is the only thing that makes it be observ'd. And that which makes it yet the stranger is, That for two Leagues together below the Fall, towards the Lake *Ontario*, or *Frontenac*, the Lands are as level as they are above it towards the Lake of *Erie*. 1678 Hennepin

Our Surprise was still greater, when we observ'd there were no Mountains within two good Leagues of this Cascade; and yet the vast quantity of Water which is discharg'd by these four fresh Seas, stops or centers here, and so falls about six hundred Foot down into a Gulph, which one cannot look upon without Horror. Two other great Out-lets, or Falls of Water, which are on the two sides of a small sloping Island, which is in the midst, fall gently and without noise, and so glide away quietly enough: But when this prodigious quantity of Water, of which I speak, comes to fall, there is such a din, and such [217] a noise, that is more deafning than the loudest Thunder.

The rebounding of these Waters is so great, that a sort of Cloud arises from the Foam of it, which are seen hanging over this Abyss even at Noon-day, when the Sun is at its heighth. In the midst of Summer, when the Weather is hottest, they arise above the tallest Firrs, and other great Trees, which grow in the slooping Island which make the two Falls of Water that I spoke of.

I wish'd an hundred times that somebody had been with us, who could have describ'd the Wonders of this prodigious frightful Fall, so as to give the Reader a just and natural Idea of it, such as might satisfy him, and create in him an Admiration of

1678 Hennepin

this Prodigy of Nature as great as it deserves. In the mean time, accept the following Draught, such as it is; in which however I have endeavour'd to give the curious Reader as just an Image of it as I could.

. . . . .

From the Mouth of the Lake *Erie* to the Great Fall, are reckon'd six Leagues, as I have said, which is the continuation of the Great River of *St. Lawrence*, which arises out of the four Lakes above-mention'd. The River, you must needs think, is very rapid for these six Leagues, because of the vast Discharge of Waters which fall into it out of the said Lakes. The Lands, which lie on both sides of it to the East and West, are all level from the Lake *Erie* to the Great Fall. Its Banks are not steep; on the contrary, the Water is almost always level with the Land. 'Tis certain, that the Ground towards the Fall is lower, by the more than ordinary swiftness of the Stream; and yet 'tis not perceivable to the Eye for the six Leagues abovesaid.

After it has run thus violently for six Leagues, it [218] meets with a small sloping Island, about half a quarter of a League long, and near three hundred Foot broad, as well as one can guess by the Eye; for it is impossible to come at it in a Canow of Bark, the Waters run with that force. The Isle is full of Cedar and Firr; but the Land of it lies no higher than that on the Banks of the River. It seems to be all level, even as far as the two great Cascades that make the Main Fall.

The two sides of the Channels, which are made by the Isle, and run on both sides of it, overflow almost the very Surface of the Earth of the said Isle, as well as the Land that lies on the Banks of the River to the East and West, as it runs South and North. But we must observe, that at the end of the Isle, on the side of the two great Falls, there is a slooping Rock which reaches as far as the Great Gulph, into which the said Waters fall; and yet the Rock is not at all wetted by the two Cascades which fall on both sides, because the two Torrents which are

made by the Isle, throw themselves with a prodigious force, one towards the East, and the other towards the West, from off the end of the Isle, where the Great Fall of all is. 1678 Hennepin

After then these two Torrents have thus run by the two sides of the Isle, they cast their Waters all of a sudden down into the Gulph by two Great Falls; which Waters are push'd so violently on by their own Weight, and so sustain'd by the swiftness of the motion, that they don't wet the Rock in the least. And here it is that they tumble down into an Abyss above 600 Foot in depth.

The Waters that flow on the side of the East, do not throw themselves with that violence as those that fall on the West. The reason is, because the Rock at the end of the Island, rises something more on this side, than it does on the West; and so the Waters being supported by it somewhat longer than [219] they are on the other side, are carry'd the smoother off: But on the West the Rock slooping more, the Waters, for want of a Support, become the sooner broke, and fall with the greater precipitation. Another reason is, the Lands that lie on the West are lower than those that lie on the East. We also observ'd, that the Waters of the Fall, that is to the West, made a sort of a square Figure as they fell, which made a third Cascade, less than the other two, which fell betwixt the South and North.

And because there is a rising Ground which lies before those two Cascades to the North, the Gulph is much larger there than to the East. Moreover, we must observe, that from the rising ground that lies over against the two last Falls which are on the West of the main Fall, one may go down as far as the bottom of this terrible Gulph. The Author of this Discovery was down there, the more narrowly to observe the Fall of these prodigious Cascades. From hence we could discover a Spot of Ground, which lay under the Fall of Water which is to the East, big enough for four Coaches to drive a breast without being wet; but because the Ground, which is to the East of the sloping Rock, where the first Fall empties it self into the Gulph, is very steep, and almost perpendicular, 'tis impossible for a Man to get

1678
Hennepin

down on that side, into the Place where the four Coaches may go a-breast, or to make his way through such a quantity of Water as falls towards the Gulph: So that 'tis very probable, that to this dry Place it is that the Rattle-Snakes retire, by certain Passages which they find under ground.

From the end then of this Island it is, that these two Great Falls of Waters, as also the third but now mention'd, throw themselves, after a most surprising manner, down into a dreadful Gulph six hundred Foot and more in depth. I have already said, that the Waters which Discharge themselves at the [220] Cascade to the East, fall with lesser force; whereas those to the West tumble all at once, making two Cascades; one moderate, the other very violent and strong, which at last make a kind of Crochet, or square Figure, falling from South to North, and West to East. After this, they rejoin the Waters of the other Cascade that falls to the East, and so tumble down altogether, though unequally, into the Gulph, with all the violence that can be imagin'd, from a Fall of six hundred Foot, which makes the most Beautiful, and at the same time most Frightful Cascade in the World.

After these Waters have thus discharg'd themselves into this dreadful Gulph, they begin to resume their Course, and continue the great River of *St. Lawrence* for two Leagues, as far as the three Mountains which are on the East of the River, and the great Rock which is on the West, and lifts it self three Fathoms above the Waters, or thereabouts. The Gulph into which these Waters are discharg'd continues it self thus two Leagues together, between a Chain of Rocks, flowing with a prodigious Torrent, which is bridled and kept in by the Rocks that lie on each side of the River.

Into this Gulph it is, that these several Cascades empty themselves, with a violence equal to the height from whence they fall, and the quantity of Waters, which they discharge. Hence arise those deafning Sounds, that dreadful roaring and bellowing of the Waters which drown the loudest Thunder, as also

the perpetual Mists that hang over the Gulph, and rise above the tallest Pines that are in the little Isle so often mention'd. After a Channel is again made at the bottom of this dreadful Fall by the Chain of Rocks, and fill'd by that prodigious quantity of Waters which are continually falling, the River of *St. Lawrence* resumes its Course: But with that violence, and his Waters beat against the [221] Rocks with so prodigious a force, that 'tis impossible to pass even in a Canow of Bark. . . . 1678 Hennepin

These Rocks, as also the prodigious Torrent, last for two Leagues; that is, from the great Fall, to the three Mountains and great Rock: But then it begins insensibly to abate, and the Land to be again almost on a level with the Water; and so it continues as far as the Lake *Ontario*, or *Frontenac*.

When one stands near the Fall, and looks down into this most dreadful Gulph, one is seized with Horror, and the Head turns round, so that one cannot look long or steadfastly upon it. But this vast Deluge beginning insensibly to abate, and even to fall to nothing about the three Mountains, the Waters of the River St. Lawrence begin to glide more gently along, and to be almost upon a level with the Lands; so that it becomes navigable again, as far as the Lake *Frontenac*. . . .

The most elaborate and least trustworthy of Hennepin's accounts of the Falls. It is interesting to compare it with his original version.

Archaelogia Americana. Worcester, Mass. 1820. Vol. 1, pp. 67–68.

1679

Relation des descouvértes et des voyages du sieur de la Salle, seigneur et gouverneur du fort de Frontenac, au delá grands lacs de la Nouvelle-France, faits par l'ordre de Monseigneur Colbert.— 1679–1680-1681. (Margry, Découvertes et établissements des Français dans . . . l'Amerique Septentrionale. Tome I, p. 441.) 1679

The author of this account is unknown. It may possibly have been written by Father Hennepin. If he did not write it, he evidently borrowed from it very freely in his later works.

1679
Tonty

TONTY, HENRI DE. Entreprises de M. de la Salle de 1678 a 1683. Relation écrite de Quebec, le 14 novembre 1684, par Henri de Tonty. (Margy, Découvertes et établissements des Français dans . . . l'Amerique Septentrionale. Tome I, p. 577.)

Tonty, who was La Salle's lieutenant, visited the Falls February 1, 1679, though his description was not written until five years later.

Curiosity led me to visit the Fall of Niagara which separates Lake Erie from Lake Frontenac (Ontario). I can only say that it is the most beautiful fall in the world. By our estimate it falls perpendicularly 500 feet and is some 200 toises wide. It throws off vapors which may be seen at a distance of sixteen leagues, and it may be heard at the same distance when it is calm. When once the swans and bustards are caught in its current it is impossible for them to take flight again, and they are dead before they get to the bottom of the fall.

1688

1688
Lahontan

LAHONTAN, LOUIS ARMAND DE LOM D'ARCE, *baron de.* Nouveaux voyages de Mr. le Baron de Lahontan, dans l'Amerique Septentrionale, qui contiennent une Relation des différens Peuples qui y habitant; la nature de leur gouvernement; leur commerce, leurs coutumes, leur religion & leur maniere de faire la guerre . . . A la Haye, Chez les Fréres l'Honoré, 1703. Vol. I, p. 107.

LAHONTAN, LOUIS ARMAND DE LOM D'ARCE. New voyages to North America. Containing an account of the several nations of that vast continent . . . the several attempts of the English and French to dispossess one another . . . and the various adventures between the French, and the Iroquese confederates of England, from 1683–1694. A geographical description of Canada . . . Written in French by Baron Lahontan . . . Done in English . . . A great part of which never printed in the original. London. Printed for H. Bonwicke, T. Goodwin, M. Wotton, B. Tooke, and S. Manship. 1703. P. 82.

LAHONTAN, LOUIS ARMAND DE LOM D'ARCE, *baron de.* New voyages to North-America, by the Baron de Lahontan; reprinted from the English edition of 1703, with facsimiles of original title-pages, maps, and illustrations, and the addition of introduction, notes, and index, by

THE FIRST KNOWN VIEW OF NIAGARA

From Hennepin's "Nouvelle découverte," 1697

Reuben Gold Thwaites . . . Chicago: A. C. McClurg. 1905. Vol. I, p. 137. 1688 Lahontan

As for the Waterfall of *Niagara;* 'tis seven or eight hundred foot high, and half a League broad. Towards the middle of it we descry an Island that leans towards the Precipice, as if it were ready to fall. All the Beasts that cross the Water within half a quarter of a League above this unfortunate Island, are suck'd in by force of the Stream: And the Beasts and Fish that are thus kill'd by the prodigious fall, serve for food to fifty *Iroquese,* who are setled about two Leagues off, and take 'em out of the water with their Canows. Between the surface of the water that shelves off prodigiously, and the foot of the Precipice, three Men may cross in a breast without any other dammage, than a sprinkling of some few drops of water.

Lahontan's book had "an immense vogue" and the various editions of it soon rivalled those of Hennepin's works in number. Of these editions those of 1703–4 are reckoned the best. The Niagara description occurs in a letter dated at "Missilimakinac, May 26, 1688." It was very popular and with all its exaggerations soon found its way into geographies and other books.

1710

The Four Kings of Canada, being a succinct account of four Indian princes lately arriv'd from North America, with a particular description of their country . . . with several other extraordinary things worthy of observation, as to the natural or curious productions, beauty, or fertility of that part of the world. London. 1710. Reprinted by J. E. Garratt and Co. London. 1891. Pp. 41–42. 1710

The River of St. Lawrence or Canada, receives in these Parts an Infinite Quantity of fresh Water from the four great Lakes, the Lake Huron, the upper Lake, the Lake of the Illinois, and the Lake Erie or of the Cat, which may properly be call'd little fresh Water Seas. This great Deluge of Water tumbling furiously over the greatest and most dreadful Heap in the World, an infinite Number of Fish take a great Delight to spawn here, and as it were suffocate here, because they cannot get over this huge Cataract: So that the Quantity taken here is incredible.

1710 A Gentleman who was Travelling this Part, went to see this Heap, which comes from a River in the North, and falls into a great Basin of Lake Outano, big enough to hold a Hundred Men of War, being there he taught the Natives to catch Fish with their Hands, by causing Trees to be cut down in the Spring, and to be roll'd to the Bank of the River, so that he might be upon them without wetting himself; by the Assistance of which he thrust his Arm into the Water up to the Elbow, where he found a prodigious Quantity of Fish of different Species, which he laid hold on by the Gills, gently stroking 'em, and when he had taken Fifty or Sixty of 'em at a Time, he use to warm and refresh himself; after this Manner, in a short Time he would catch Fish enough to feed Fifty or Sixty families.

1721

1721 Charlevoix

CHARLEVOIX, PIERRE FRANÇOIS XAVIER DE. Histoire et description generale de la Nouvelle France, avec le Journal Historique d'un voyage fait par ordre du roi dans l'Amerique Septentrionale. Paris. Chez la Veuve Ganeau. 1744. Vol. V, pp. 335–336, 343–347.

CHARLEVOIX, PIERRE FRANÇOIS XAVIER DE. Journal of a Voyage to North-America. Undertaken by order of the French King. Containing the geographical description and natural history of that country, particularly Canada . . . In a series of letters to the Duchess of Lesdiguières. Translated from the French. London: R. and J. Dodsley. 1761. Vol. I, pp. 345–356.

Charlevoix is perhaps the best known of the early Jesuit writers on America. He was at Niagara Falls in May, 1721. His account of the Falls is contained in three letters written to the Duchess of Lesdiguiéres. It will be noticed that he employs the term "horseshoe" to describe the shape of the fall.

(Niagara, May 23, 1721.)

Now, Madam, we must acknowledge, that nothing but zeal for the publick good could possibly induce an officer to remain in such a country as this, than which a wilder and more frightful is not to be seen. On the one side you see just under your feet, and as it were at the bottom of an abyss, a great

river, but which in this place is liker a torrent by its rapidity, by the whirlpools formed by a thousand rocks, through which it with difficulty finds a passage, and by the foam with which it is always covered; on the other the view is confined by three mountains placed one over the other, and whereof the last hides itself in the clouds. This would have been a very proper scene for the poets to make the Titans attempt to scale the heavens. In a word, on whatever side you turn your eyes, you discover nothing which does not inspire a secret horror. 1721 Charlevoix

You have, however, but a very short way to go, to behold a very different prospect. Behind those uncultivated and uninhabitable mountains, you enjoy the sight of a rich country, magnificent forests, beautiful and fruitful hills; you breathe the purest air, under the mildest and most temperate climate imaginable, situated between two lakes the least of which is two hundred and fifty leagues in circuit.

. . . . .

(At the Falls of Niagara, May 26, 1721.)

. . . The officers having departed, I ascended those frightful mountains, in order to visit the famous Fall of Niagara, above which I was to take water; this is a journey of three leagues, though formerly five; because the way then lay by the other, that is, the west-side of the river, and also because the place for embarking lay full two leagues above the Fall. But there has since been found, on the left, at the distance of half a quarter of a league from this cataract, a creek, where the current is not perceivable, and consequently a place where one may take water without danger. My first care, after my arrival, was to visit the noblest cascade perhaps in the world; but I presently found the baron de la Hontan had committed such a mistake with respect to its height and figure, as to give grounds to believe he had never seen it. It is certain, that if you measure its height by that of the three mountains, you are obliged to climb to get at it,

1721
Charlevoix

it does not come much short of what the map of M. Deslisle makes it; that is, six hundred feet, having certainly gone into this paradox, either, on the faith of the baron de la Hontan or father Hennepin; but after I arrived at the summit of the third mountain, I observed, that in the space of three leagues, which I had to walk before I came to this piece of water, though you are sometimes obliged to ascend, you must yet descend still more, a circumstance to which travellers seem not to have sufficiently attended. As it is impossible to approach it but on one side only, and consequently to see it, excepting in profil, or sideways; it is no easy matter to measure its height with instruments. It, has, however, been attempted by means of a pole tied to a long line, and after many repeated trials, it has been found only one hundred and fifteen, or one hundred and twenty feet high. But it is impossible to be sure that the pole has not been stopt by some projecting rock; for though it was always drawn up wet, as well as the end of the line to which it was tied, this proves nothing at all, as the water which precipitates itself from the mountain, rises very high in foam. For my own part, after having examined it on all sides, where it could be viewed to the greatest advantage, I am inclined to think we cannot allow it less than a hundred and forty, or fifty feet.

As to its figure, it is in the shape of a horseshoe, and is about four hundred paces in circumference; it is divided into two, exactly in the middle, by a very narrow island, half a quarter of a league long. It is true, those two parts very soon unite; that on my side, and which I could only have a side view of, has several branches which project from the body of the cascade, but that which I viewed in front, appeared to me quite entire. The baron de la Hontan mentions a torrent, which if this author has not invented it, must certainly fall through some channel on the melting of the snows.

You may easily guess, Madam, that a great way below this Fall, the river still retains strong marks of so violent a shock; accordingly, it becomes only navigable three leagues below, and

exactly at the place which M. de Joncaire has chosen for his residence [that is at the present Lewiston]. It should by right be equally unnavigable above it, since the river falls perpendicular the whole space of its breadth. But besides the island, which divides it into two, several rocks which are scattered up and down above it, abate much of the rapidity of the stream; it is notwithstanding so very strong, that ten or twelve Outaways trying to cross over to the island to shun the Iroquoise who were in pursuit of them, were drawn into the precipice, in spite of all their efforts to preserve themselves. 1721 Charlevoix

I have heard say that the fish that happen to be entangled in the current, fall dead into the river, and that the Indians of those parts were considerably advantaged by them; but I saw nothing of this sort. I was also told, that the birds that attempted to fly over were sometimes caught in the whirlwind formed, by the violence of the torrent. But I observed quite the contrary, for I saw small birds flying very low, and exactly over the Fall, which yet cleared their passage very well.

This sheet of water falls upon a rock, and there are two reasons which induce me to believe, that it has either found, or perhaps in time hollowed out a cavern of considerable depth. The first is, that the noise it makes is very hollow, resembling that of thunder at a distance. You can scarce hear it at M. de Joncaire's, and what you hear in this place, may possibly be only that of the whirlpools caused by the rocks, which fill the bed of the river as far as this. And so much the rather as above the cataract, you do not hear it near so far. The second is, that nothing has ever been seen again that has once fallen over it, not even the wrecks of the canoe of the Outaways, I mentioned just now. . . . Besides I perceived no mist above it, but from behind, at a distance, one would take it for smoke, and there is no person who would not be deceived with it, if he came in sight of the isle, without having been told before hand that there was so surprising a cataract in this place.

1721 Charlevoix

The soil of the three leagues I had to walk a foot to get hither, and which is called the carrying-place of Niagara, seems very indifferent; it is even very ill-wooded, and you cannot walk ten paces without treading on ant-hills, or meeting with rattle-snakes, especially during the heat of the day.

1721 Dudley

DUDLEY, PAUL. An account of the falls of the river Niagara, taken at Albany, October 10, 1721, from Monsieur Borassaw, a French native of Canada. (Royal Society of London, Philosophical transactions. April–May, 1722, pp. 69–72.)

Borassaw, Dudley's informant, appears to have been a French boatman or trader. He was apparently at the Falls several times, among them in May, 1721, when de Longueuil made his measurements of the cataract. The transcription as made by Dudley is noteworthy for its critical spirit. It was printed in various other places than that cited above.

The falls of Niagara are formed by a vast ledge or precipice of solid rock, lying across the whole breadth of the river, a little before it empties itself into, or forms the Lake Ontario.

M. Borassaw says, that in the spring 1722 (should be 1721), the governor of Canada ordered his son, with three other officers, to survey the Niagara, and take the exact height of the cataract, which they accordingly did with a stone of half a hundred weight, and a large cod-line, and found it on a perpendicular no more than 26 fathoms—"*vingt et six bras.*"

This differs very much from the account Father Hennepin has given to that cataract; for he makes it 100 fathoms, and our modern maps from him, as I suppose, mark it 600 feet; but I believe Hennepin never measured it, and there is no guessing at such things.

When I objected Hennepin's account of those falls to M. Borassaw, he replied, that accordingly everybody had depended on it as right, until the late survey. On further discourse he acknowledged, that below the cataract, for a great way, there were numbers of small ledges or stairs across the river, that lowered it still more and more, till it came to a level; so that if

all the descents be put together, he does not know but that the difference of the water above the falls and the level below, may come up to Father Hennepin; but the strict and proper cataract on a perpendicular is no more than 26 fathoms, or 156 feet, which yet is a prodigious thing, and what the world I suppose cannot parallel, considering the size of the river, being near a quarter of an English mile broad, and very deep water. 1721 Dudley

Several other things M. Borassaw set me right in, as to the falls of Niagara. Particularly it has been said, that the cataract makes such a prodigious noise, that people cannot hear each other speak at some miles distances; whereas he affirms, that you may converse together close by it. I have also heard it positively asserted, that the shoot of the river, when it comes to the precipice, was with such force, that men and horse might march under the body of the river without being wet; this also he utterly denies, and says the water falls in a manner right down.

What he observed farther to me was, that the mist or shower which the falls make, is so extraordinary, as to be seen at five leagues distance, and rise as high as the common clouds. In this *brume* or cloud, when the sun shines, you have always a glorious rainbow. That the river itself, which is there called the river Niagara, is much narrower at the falls than either above or below; and that from below there is no coming nearer the falls by water than about six English miles, the torrent is so rapid, and having such terrible whirlpools.

He confirms Father Hennepin's and Mr. Kelug's[?] account of the large trouts of those lakes, and solemnly affirmed there was one taken lately, that weighed 86 lb. which I am rather inclined to believe, on the general rule, that fish are according to the waters. To confirm which, a very worthy minister affirmed, that he saw a pike taken in a Canada river, and carried on a pole between two men, that measured five feet ten inches in length, and proportionately thick.

1749

1749
Bonnécamps

BONNÉCAMPS, JOSEPH PIERRE DE. Account of the voyage on the Beautiful river made in 1749, under the direction of Monsieur de Celoron, by Father Bonnécamps. (Thwaites, Jesuit Relations, LXIX, p. 159.)

Bonnécamps was a French Jesuit who accompanied the De Celeron expedition of the summer of 1749. The party passed Niagara Falls on its way to the Ohio. The extract given is taken from Bonnécamps's journal of the expedition.

The famous waterfall of Niagara is very nearly equidistant from the two lakes. It is formed by a rock cleft vertically, and is 133 feet, according to my measurement, which I believe to be exact. Its figure is a half-ellipse, divided near the middle by a little island. The width of the fall is perhaps three-eighths of a league. The water falls in foam over the length of the rock, and is received in a large basin, over which hangs a continual mist.

1751

1751
La Lande

LA LANDE, M. DE LA. Memoire sur la vie de M. Picquet, missionaire au Canada. (Lettrès édifiantes et curieuses, écrites des missions étrangères. Nouvelle edn. Paris: J. P. Merigot. 1783. Tome XXVI, p. 32.)

Picquet's description may also be found in the *Proceedings and Transactions of the Royal Society of Canada*, volume XII, section I, page 20. An English version occurs in O'Callaghan's *Documentary History of the State of New York*, 8vo. ed. 1849, volume I, pages 434–435.

From Niagara, Mr. Picquet went to the Carrying place which is six leagues from that Post. He visited on the same day the famous Fall of Niagara by which the four Great Canada lakes discharge themselves into Lake Ontario. This Cascade is as prodigious by its height and the quantity of water which falls there, as by the variety of its falls which are to the number of six principal ones divided by a small island, leaving three to the North and three to the South. They produce of themselves a singular symmetry and wonderful effect. He measured the height of one of those falls from the south side, and he found it about one hundred and forty feet.

1753

B (ONNEFONS), J. C. Voyage au Canada dans le Nord de l'Amerique Septentrionale fait depuis l'an 1751 a 1761. Quebec: Imprimerie Léger Brousseau. 1887. (Abbé H. R. Casgrain, ed.) P. 57–61. 1753 B(onnefons)

L'auteur pourait bien etre M. Bonnefons, qui servit sous Pouchet et parait avoir eu sa confiance; c'est l'opinion de nos erudits, particulierement de l'abbe Verreault.

SEVERANCE, FRANK HAYWARD. Adventures of M. Bonnefons, 1753. (Severance, *Studies of the Niagara frontier*, pp. 335–339.) 1753 Severance

The next day, April 12th [1753], we went on by land. From Fort Niagara we ascended the three mountains which are at the west of the fort and on the top of each of which we found a level space formed of flat rock, very even, which makes a resting place for travelers who pass there. It is about two leagues from the bottom to the top of the mountains. When we had reached the top we had to rest, after which we continued to march. At a quarter of a league to the north of the last mountain is the famous fall of Niagara, the noise of which may be heard nearly three leagues. At the place to the south of where we were was a little station, newly established, for the building of batteaux and canoes needed for the navigation of Lake Erie. This station was named Toronto, the English gave to it that of Scuyler or Sckuiler. At the time of our passage there was there a garrison of forty men, Canadians, all boat carpenters. We rested there three days, during which they loaded the provisions, ammunition and goods which we had to take with us to the upper end of Lake Erie.

The curiosity permitted to travelers made me wish to visit the Niagara fall, which I had heard spoken of as a marvelous curiosity. I was one of three to go there. I examined this astonishing cataract, which has the form of a crescent, a quarter of a league in extent. They give to it the height, according to common report, of 180 feet. It is the discharge of Lake Erie, and receives its waters, which it throws into the strait or river

1753 Severance

of Niagara, which then empties into Lake Ontario near Fort Niagara.

The approaches to this fall appear inaccessible, especially on the south side where we were, and present from both sides a rock covered with bushes, which grow naturally in the crevices. It is impossible when near it to make speaking heard, unless very near to the ears. After having well examined this fall from above, I proposed to the two persons who had accompanied me to go down below. They opposed the difficulty of getting there, there being neither road, nor path, nor security, and that the undertaking was perilous and rash to go there by the bushes, which appeared too weak to sustain us, or by the roots which were not strong, having only hold in the joints of the rock. These reasons, all of force as it appeared to me, did not prevent me from persisting in my curiosity. I resolved then to expose myself alone and presently I began to descend with the intention of making sure of the branches which I encountered on my way; descending backwards, so that I would not let go one after another, until I had seized others of the same firmness.

I was about an hour in getting down, not without commending myself to Providence, for I perceived the rashness of my undertaking, but I had to finish as much from pride as from curiosity. Finally, I came to the bottom, at about twenty toises from the foot of the fall, when even at that distance, did not prevent me from being drenched by the rain-like spray which the fall made. I advanced still nearer. I passed over a fine shingle of flat rock, which led me under the sheet of falling water. It was then that I was very much more drenched and felt the trembling of the rocks caused by the fall of water, which made me hesitate whether I ought to go on or retreat. However, reflecting that this trembling must be the same always, I resolved to go forward, and after having made thirty steps more I found myself in a sort of cavern, formed in the rocks, in the midst of which ran the sheets of water from crevices at several points, which made cascades, agreeable and amusing enough if the rain

caused by the fall had permitted me to stay there a little time. 1753
I seemed in this place to be in the midst of the cataract. The Severance
noise and the trembling were very great. That did not prevent me from examining the cavern, which appeared of a length of six toises by about twenty feet in height. Its depth was scarcely more than fifteen feet. I would have passed it, but was unable to go further because of large clefts which I was unable to cross. I had to retrace my steps. All shivering with cold, and drenched, I hastened to take again the road by which I had descended. I climbed up the bushes quicker than I had descended them. Arrived on top, I found the two people with whom I had come. They wished to interrogate me. This was futile. I was deaf and was not able to hear them. Cold and hunger forced me to hasten to Toronto, where, being arrived, I at once changed my clothes, after which I ate.

It was not until two hours afterwards that the deafness left me and I was able to give an account of what I had seen. I have since questioned several travelers to learn if they had knowledge of any one who had descended this fall. They had heard no one tell of it. That does not seem extraordinary to me, knowing that the Canadians are so little curious that they would not deign to turn aside from their route for something worthy of report. This indifference on their part does not however give me pretense of being the only one who may have risked himself in this perilous visit, nor that there will not be found in days to come others as curious as I. But if that happens, those who will have the enterprise will be able to confirm what I report to have seen.

It is common report in this country that a native Iroquois, finding himself with his canoe drawn into the current from above, and not being able to draw out of the force of it, wrapped himself in his blanket, glided along in his canoe, and abandoned himself to the current, which quickly precipitated him over the fall, where he was swallowed up with his canoe without reappearing. I have seen the fall of a tree, drawn down by the current,

1753
Severance

which did not again appear; from which I have concluded that there is a gulf where everything that falls from above is swallowed up.

About twenty feet above this fall is a little island, formed of rock, some fifteen toises in length, by 10 or 12 feet in width, overgrown with bushes, with one single tree in the midst. The water of Lake Erie, which rushes around it and throws itself into the fall, is very rapid and glides over a shelf of flat rock at a depth of four or five feet, especially on the side to the south, where I examined it.

One finds at the foot of the fall, along the river Niagara, a great many dead fish. Travelers pretend that these fish come from Lake Erie. They find they have become drawn down into the fall by the rapidity of the water. I have given to this matter a reflection which seems to me just. It is that they first ascend rather than descend, and that coming from Lake Ontario, ascending near to the fall, they are there killed, afterward drawn down by the current which throws them on the banks, where one often finds them only stunned. Now if they came from Lake Erie they would be killed and, what is more, swallowed up in the fall.

It is said also that birds which fly over the fall are drawn into it in spite of themselves, by the force of the air. I am not sure of this fact, which, however, is not lacking in probability, since there is often seen there a rainbow which seems strongly to attract the birds who direct their flight into it, where they become confused and drenched, lacking strength to ascend. And it may perhaps be only birds of passage, for those which inhabit the neighborhood are so accustomed to the rainbow and to the noise of the fall that they know how to preserve themselves, since they are seldom seen there, although there are a great many of them in this vicinity.

This account is not so well known as many others but it is interesting nevertheless. The original manuscript was in the form of a journal. Both the original and a copy of it were at last accounts to be found in Paris.

POUCHOT, M. ———. Memoir upon the late war in North America, between the French and English, 1755–60; followed by observations upon the theatre of actual war, and by new details concerning the manners and customs of the Indians; with topographical maps. Translated and edited by Franklin B. Hough. Roxbury, Mass.: W. Elliot Woodward. 1866. Vol. II, pp. 153–156, 173–179.

Half a league above the falls, the river which is about half a league wide, has only a strong current. It from thence descends in boiling waves to the falls, where it plunges vertically a hundred and forty feet, upon a bank of very hard rocks. Its breadth is about nine hundred toises. The rest of this waterfall makes a very open arc, at two thirds of which we see a little wooded island which looks as if it was even ready to be engulphed.

At the bottom of the falls, the river forms a great basin between the rocks, where the water is so still that they can cross it in bateaux. From the foot of the fall, the waters rebound nearly forty feet high, which makes them appear like ice.

We often find on the shores of this basin, fish, bears, deer, geese, ducks and various kinds of birds which have been killed in passing over, having been drawn in by the water, or the current of air formed by the falls. The Indians collect these. . . .

The most northerly parts of America being very elevated, the rivers which flow from thence must necessarily before discharging themselves into the lakes or rivers, and according to the slope of land, have falls of greater or less size. The most celebrated of all, is without doubt that of Niagara. The Indians near Quebec regarded this as at the western extremity of the continent. When the French came to establish themselves there, they assured them, "that at the end of Lake Ontario, there is a fall which may be a league wide, where an immense body of water falls into the lake, and that beyond this fall there could be seen no more land, neither on one side or the other, but only a sea, so immense that they could see no end, nor say positively that any one had seen it,— that the sun went down on the right hand of this lake, &c."

1755–60
Pouchot

The journeys which the French undertook at an early period into the interior of America, gave them a knowledge less vague concerning this celebrated cascade. They were at first, however, very incorrect, and we scarcely depend upon the details which the Baron de la Hontan and Father Hennepin had given us. The description which we derive from Father Charlevoix, merits more dependence. M. de Buffon has not hesitated to insert it in his immortal work. Besides what M. Pouchot has related of this fall in the observations which follow, we have found nothing among his papers which we could use.

The river of the Portage, or of the Niagara, is properly nothing but the outlet of Lake Erie, which discharges itself into Lake Ontario, at six leagues from the Falls. It is not easy to measure with instruments the elevation of this fall, and travelers who could see it only in profile, have therefore varied considerably in their accounts. The Baron de la Hontan asserts that they are seven or eight hundred feet high, and the Chevalier de Tonti, a hundred toises. The estimate of Father Charlevoix is much more correct. He gives a hundred and forty or a hundred and fifty feet as the height of the Falls of Niagara.

M. de Buffon had at first supposed this fall was the finest in the whole world, and that it owed this honor to its elevation, but after a little he appears to retract in giving preference to that of Terni in Italy. Although most travelers do not give these falls more than two hundred feet, the illustrious naturalist supposes them to be three hundred. . . .

It is not the height, but the breadth of a cascade which renders it considerable, and that of Niagara, having nine hundred feet in breadth, evidently surpasses all others. It cannot be compared perhaps with the Terni, which, in relative height, is inferior to several which we know in the country of the Grisons, Valois and Switzerland. . . .

The fall of Niagara is also remarkable from the phenomena occasioned by its breadth. When the weather is clear, we always see several rainbows, one within another, of which it is

easy to observe the cause. Sometimes a light fog rises like smoke above this cascade, and seems to be a forest on fire. It may be seen from Lake Ontario, fifteen leagues beyond Fort Niagara. This is a certain sign of rain or snow, and a sure means for finding the fort which is at the mouth of the river of the portage. 1755–60 Pouchot

The noise of the fall, increased by echoes from the surrounding rocks, may be heard a greater or less distance according to the direction of the wind. It is not unusual to hear it ten or twelve leagues, but as a distant thunder, which rolls very heavily. This made Father Charlevoix conjecture, that in time it had formed a cavern under the fall. He gives further as a reason, that nothing ever rises that has once been carried over. The cause of this fact is, that the whirlpools which are always found at the foot of great waterfalls, are in places where the currents of the river are contracted with great force, and are too much drawn together.

An anxiety to criticise the Baron de la Hontan, has led Father Charlevoix to deny that fish which are often drawn into the rapids above, are killed in the fall. "They have further assured me," says this Jesuit, "that birds flying over, are sometimes enveloped in the whirlwinds formed in the air by the violence of the rapid. But I have observed to the contrary, as I have seen little birds flying very low, directly above the fall and come out uninjured. . . ." Birds of prey might be shot very easily at Niagara in calm weather, but not when the winds are strong in the south bend. Then, as M. Pouchot has observed many times, aquatic birds which follow the course of the river and hover over the rocks, are compelled to find shelter by flying near the surface of the water, but not being able in this position to resist the currents of air, they are precipitated into the basin. It is much the same with the fish that are drawn into the rapids above the falls, which are sensible as far as Lake Erie. A great many animals also perish in the vortices of the water, which are so dreadful above the falls that they cannot swim them. Ten or twelve Outaouais Indians, having wished to cross at this part

1755–60
Pouchot

of the river in their canoes to escape from a party of the Iroquois who were pursuing them, made vain efforts to resist the impetuosity of the currents, which did not hinder them from being engulphed in the falls.

Although the mass of waters falls vertically upon the rocks, there has formed, notwithstanding, by the strong impulse of the current and its great volume, a considerable talus. Baron de la Hontan pretends that below there is a path where three men might easily pass from one side to the other without being wet, or even getting a drop of water upon them. Neither Father Charlevoix nor M. Pouchot speak of this path, and probably no one would like to try it.

Around the falls we observe the banks eighty feet high, which indicate plainly that the channel which the river has formed, was formerly almost on a level with Lake Erie. The falls of Niagara ought to have then been much higher than at present, and the bed of rock which exists, has been worn little by little to bring it to its present form.

When we come to the top of the neighboring mountains near the falls, we find a plain three or four leagues wide, which extends from the shores of Toronto around Lake Ontario, varying according to the trend of the shore, to the north-east and south-west. This terrace or chain of hills begins at the northern mountains, and extends eastward into the country of the Five Nations. We cannot doubt but that these hills once formed the lake shore, and that its waters have gradually subsided, leaving the plains that surround it.

The extent of all the great lakes, and especially that of Lake Erie, which is above the falls of Niagara, has undergone the same change. The banks of the River St. Lawrence, which is their outlet, has not been exempt from this change. The Island of Montreal, formed by two branches of this river, furnishes us the proof of this. Its ridges are elevated considerably above its shores, and show by this, that all the grounds from their foot to the river bank were formerly covered by its waters which

have gradually receded in proportion as the volume of the lakes has diminished by the gradual lowering of Niagara Falls and the other rapids or cascades that interrupt the course of the river above Montreal. 1755–60 Pouchot

We also report a proof of change of which we will speak. If we seek upon the highest mountains in Canada, we shall everywhere find sea shells of every sort, as well as in the ancient plains covered with lime-stone, sulphurous rock, shales and sandstones. The more recent plains are on the contrary filled with petrifactions of wood, fruits, serpents, snails, and various fresh water shells.

SUMMARY OF THE FRENCH PERIOD

It is appropriate that our quotations from the first, or French, period of Niagara Falls history should be concluded with extracts from the work of Captain François Pouchot, the defender of Fort Niagara and the last official representative of French dominion on the American side of the Niagara River. The original narrative, published at Yverdon in Switzerland in 1781, is both rare and costly. Even the translation, which we have cited and from which we quote, is difficult to procure.

The first extract adds little to our knowledge of the Falls except the detail concerning the possibility of crossing the river below the Falls in bateaux.

It is rather difficult to segregate Pouchot's personal contribution in the second extract, for the compiler has apparently added his own observations to those of Pouchot. It is interesting, nevertheless, not only because of its comparatively early date and its critical attitude toward previous writers on the Falls, but because of the additional information which it presents.

Several facts are outstanding in this brief presentation of the earliest period of Niagara Falls history. Most striking, perhaps, is the antiquity of that history. We are not accustomed to think of the Niagara region in the same breath with the Atlantic coast,

but the fact remains that Niagara was known even before Jamestown and Plymouth Rock. Our lack of knowledge, or rather of correct feeling, on this subject is probably to be explained by the fact that the first accounts of Niagara Falls were written in French, and that the work of discovery was done, not by traders or settlers pushing westward from the eastern seaboard, but by priests coming down the St. Lawrence valley into the Great Lakes region to carry the gospel to the Indians, or by soldiers and explorers seeking to defend and extend the French dominion.

There were no doubt visitors even in the earliest days who did not write of their impressions of the Falls. Doubtless, too, there are other descriptions besides those cited still to be unearthed in old manuscripts, but these possibilities in the way of Niagara literature do not concern us here. The impressive fact for us is the extreme rarity and comparative meagerness, to say nothing of inaccuracy, of the accounts which have been preserved and which we have quoted. Before passing judgment on these sources of information it must be remembered, as already intimated, that the accounts given are in most cases those of priests and warriors rather than of professional writers; of men who wrote with no scientific knowledge to speak of, perhaps without adequate means or even time for due examination, from hearsay often, in haste no doubt, and in the face of hardship and danger. Under the circumstances inaccuracy was natural if not inevitable. As for exaggeration, that is not to be wondered at before such an immense and unexpected sight. Its effects are impressive enough even today after more than three centuries of information. What must have been the effects in the case of the lonely traveler who came unexpectedly upon the nameless "Sault" in the primeval wilderness!

The fact is the discovery of Niagara and the dissemination of correct ideas of it was a slow growth, a process rather than an isolated event. Not only the facts concerning the Falls but the very name of this wonder of the world had to be established.

Indeed, even to this day the controversy regarding the origin and proper spelling of the word has not been settled.

The chapter deals essentially with first things. In the course of it we have mentioned the first allusion to the cataract, indicated the first writer to name the Falls, and quoted the first-hand description. We have said nothing, however, about the first man to see the Falls. Hennepin was long credited with their discovery. The extracts in this chapter are sufficient evidence that whether Hennepin was the first man to see the Falls or not, he was not the first man to write of them. It is not at all beyond the bounds of probability that Hennepin had read some of these earlier accounts. It should be said for Hennepin in this connection that he was the first man to see, to describe and to depict Niagara.[1] We do not know and have no means of finding out what white man first saw the Falls. There are those who think that Etienne Brulé was the man, but there is no proof of it.

[1] It should be borne in mind that we are here dealing with the Falls and not with the river. Dallion, a Franciscan missionary, appears to have reached the river as early as 1626 though the name does not appear. Brebeuf and Chaumonot were in the vicinity of the river in the winter of 1640–1641 but they probably never saw the Falls. Certainly they did not write of them. Lalement, another Jesuit visitor, writing in 1641, names the river but says nothing of the Falls. The list might no doubt be extended.

Chapter II

CHAPTER II

OTHER EIGHTEENTH CENTURY ACCOUNTS: THE ENGLISH PERIOD

1750

KALM, PETER. A letter from Mr. Kalm, a gentleman of Sweden, now on his travels in America, to his friend in Philadelphia, containing a particular account of the great fall of Niagara, September 2, 1750. (Gentleman's mag., Jan., 1751. 21:15–19.) 1750 Kalm

A letter from Mr. Kalm, a Swedish gentleman, late on his travels in America, to his friend in Philadelphia; containing a particular account of the great fall of Niagara. Under date of Albany, Sep. 2, 1750. (Dodsley's ann. reg. 4th ed., Lond.: J. Dodsley, 1765. 2:388–94.)

KALM, PETER. A letter from Mr. Kalm, a gentleman of Sweden, now on his travels in America, to his friend in Philadelphia, containing a particular account of the great fall of Niagara. (*In* Bartram, John, Observations on the inhabitants, climate, soil, rivers, productions, animals, and other matters worthy of notice. . . . Lond.: Whiston and White. 1751. Pp. 79–94.)

SIR, *Albany, Sep.* 2, 1750.

After a pretty long journey made in a short time, I am come back to this town. You may remember, that when I took my leave of you, I told you, I would this summer, if time permitted, take a view of *Niagara* Fall, esteemed one of the greatest curiosities in the World. When I came last year from *Quebec*, you enquir'd of me several particulars concerning this fall; and I told you what I heard of it in *Canada*, from several *French* gentlemen who had been there: but this was still all hear-say; I could not assure you of the truth of it, because I had not then seen it myself, and so it could not satisfy my own, much less your curiosity. Now, since I have been on the spot, it is

1750
Kalm

in my power to give you a more perfect and satisfactory description of it.

After a fatiguing travel, first on horseback thro' the country of the *Six Indian Nations*, to *Oswego*, and from thence in a canoe upon lake *Ontario*, I came on the 12th of *August* in the evening to *Niagara* Fort. The *French* there seemed much perplexed at my first coming, imagining I was an *English* officer, who under pretext of seeing *Niagara* Falls, came with some other view; but as soon as I shew'd them my passports, they chang'd their behaviour, and received me with the greatest civility. *Niagara* Fall is six *French* leagues from *Niagara* Fort. you first go three leagues by water up *Niagara* river, and then three leagues over the carrying place. As it was late when I arriv'd at the Fort, I could not the same day go to the Fall, but I prepar'd myself to do it the next morning. The commandant of the Fort, Monsr. *Beaujon*, invited all the officers and gentlemen there to supper with him. I had read formerly almost all the authors that have wrote any thing about this Fall; and the last year in *Canada*, had made so many enquiries about it, that I thought I had a pretty good Idea of it, and now at supper, requested the gentlemen to tell me all they knew and thought worth notice relating to it, which they accordingly did. I observed that in many things they all agreed, in some things they were of different opinions, of all which I took particular notice. When they had told me all they knew, I made several queries to them concerning what I had read and heard of it, whether such and such a thing was true or not? and had their answers on every circumstance. But as I have found by experience in my other travels, that very few observe nature's works with accuracy, or report the truth precisely, I cannot now be entirely satisfied without seeing with my own eyes whenever 'tis in my power, Accordingly the next morning, being the 13th of *August*, at break of day, I set out for the Fall. The commandant had given orders to two of the Officers of the Fort to go with me and show me every thing, and also sent by them an order to Monsr. *Jonqueire*, who had liv'd ten years by the carry-

ing-place, and knew every thing worth notice of the Fall, better than any other person, to go with me, and show and tell me whatever he knew. A little before we came to the carrying-place, the water of *Niagara* River grew so rapid, that four men in a light birch canoe, had much difficulty to get up thither. Canoes can go half a league above the beginning of the carrying-place, tho' they must work against a water extremely rapid; but higher up it is quite impossible, the whole course of the water for two leagues and a half up to the great Fall, being a series of smaller Falls, one under another, in which the greatest canoe or Battoe would in a moment be turn'd upside down. We went ashore therefore, and walk'd over the carrying-place, having besides the high and steep side of the river, two great hills to ascend one above the other. Here on the carrying-place I saw above 200 *Indians*, most of them belonging to the *Six Nations*, busy in carrying packs of furs, chiefly of deer and bear, over the carrying-place. You would be surpriz'd to see what abundance of these things are brought every day over this place. An *Indian* gets 20 pence for every pack he carries over, the distance being three leagues. Half an hour past 10 in the morning we came to the great Fall, which I found as follows. to the river (or rather strait,) runs here from S. S. E. to N. N. W and the rocks of the great Fall cross it, not in a right line; but forming almost the figure of a semicircle or horse shoe. Above the Fall, in the middle of the river is an island, lying also S. S. E. and N. N. W. or parallel with the sides of the river; its length is about 7 or 8 french arpents (an arpent being 180 feet.) the lower end of this Island is just at the perpendicular edge of the Fall. On both sides of this island runs all the water that comes from the lakes of *Canada*, viz. Lake *Superior*, lake *Mischigan*, lake *Huron*, and lake *Erie*, which you know are rather small seas than lakes, and have besides a great many large rivers that empty their water in them, of which the greatest part comes down this *Niagara* Fall. Before the water comes to this island, it runs but slowly, compar'd with its

1750 Kalm

1750 Kalm

motion when it approaches the island, where it grows the most rapid water in the World, running with a surprizing swiftness before it comes to the Fall; it is quite white, and in many places is thrown high up into the air! The greatest and strongest battoes would here in a moment be turn'd over and over. The water that goes down on the west side of the island, is more rapid, in greater abundance, whiter, and seems almost to outdo an arrow in swiftness. When you are at the Fall, and look up the river, you may see, that the river above the Fall is every where exceeding steep, almost as the side of a hill. When all this water comes to the very Fall, there it throws itself down perpendicular! It is beyond all belief the surprize when you see this! I cannot with words express how amazing it is! You cannot see it without being quite terrified; to behold so vast a quantity of water falling headlong from a surprising height! I doubt not but you have a desire to learn the exact height of this great Fall. Father *Hennepin*, supposes it 600 Feet perpendicular; but he has gained little credit in *Canada;* the name of honour they give him there, is *un grand Menteur*, or *The great Liar;* he writes of what he saw in places where he never was. 'tis true he saw this Fall: but as it is the way of some travellers to magnify every thing, so has he done with regard to the fall of *Niagara*. This humour of travellers, has occasioned me many disappointments in my travels, having seldom been so happy as to find the wonderful things that had been related by others. For my part, who am not fond of the *Marvellous*, I like to see things just as they are, and so to relate them. Since Father *Hennepin*'s time, this Fall by all the accounts that have been given of it, has grown less and less; and those who have measur'd it with mathematical instruments find the perpendicular fall of the water to be exactly 137 feet. Monsr. *Morandrier*, the king's engineer in *Canada*, assured me, and gave it me also under his hand, that 137 Feet was precisely the height of it; and all the *French* Gentlemen that were present with me at the Fall, did agree with him, without the least contradiction: it is true, those who have try'd to measure it with a

line, find it sometimes 140, sometimes 150 feet, and sometimes more; but the reason is, it cannot that way be measured with any certainty, the water carrying away the Line.— When the water is come down to the bottom of the rock of the Fall, it jumps back to a very great heighth in the air; in other places it is white as milk or snow; and all in motion like a boiling chaldron.— You may remember, to what a great distance *Hennepin* says the noise of this great Fall may be heard. All the gentlemen who were with me, agreed, that the farthest one can hear it, is 15 leagues, and that very seldom. When the air is quite calm, you can hear it to *Niagara* Fort; but seldom at other times, because when the wind blows, the waves of Lake *Ontario* make too much noise there against the Shore.— They inform'd me, that when they hear at the Fort the noise of the Fall, louder than ordinary, they are sure a North East Wind will follow, which never fails: this seems wonderful, as the Fall is South West from the Fort: and one would imagine it to be rather a sign of a contrary wind. Sometimes, 'tis said, the Fall makes a much greater noise than at other times; and this is look'd upon as a certain mark of approaching bad weather, or rain; the *Indians* here hold it always for a sure sign. When I was there, it did not make an extraordinary great noise: just by the Fall, we could easily hear what each other said, without speaking much louder than common when conversing in other places. I do not know how others have found so great a noise here, perhaps it was at certain times, as abovementioned. From the Place where the water falls, there rise abundance of vapours, like the greatest and thickest smoak, sometimes more, sometimes less: these vapours rise high in the air when it is calm, but are dispers'd by the wind when it blows hard. If you go nigh to this vapour or fog, or if the wind blows it on you, it is so penetrating, that in a few minutes you will be as wet as if you had been under water. I got two young *Frenhmen* to go down, to bring me from the side of the Fall at the bottom, some of each of the several kinds of herbs, stones and shells they should find there; they returned in a few

1750 Kalm

1750 Kalm

minutes, and I really thought they had fallen into the water: they were obliged to strip themselves quite naked, and hang their clothes in the sun to dry. When you are on the other East side of the Lake *Ontario*, a great many leagues from the Fall, you may, every clear and calm morning see the vapours of the Fall rising in the air; you would think all the woods thereabouts were set on fire by the *Indians*, so great is the apparent smoak. In the same manner you may see it on the West side of the lake *Erie*, a great many leagues off.

Several of the *French* gentlemen told me, that when birds come flying into this fog or smoak of the fall, they fall down and perish in the Water; either because their wings are become wet, or that the noise of the fall astonishes them, and they know not were to go in the Dark; but others were of opinion, that seldom or never any bird perishes there in that manner; because, as they all agreed, among the abundance of birds found dead below the fall, there are no other sorts than such as live and swim frequently in the water; as swans, geese, ducks, water-hens, teal, and the like. And very often great flocks of them are seen going to destruction in this manner; they swim in the river above the fall, and so are carried down lower and lower by the water, and as water-fowl commonly take great delight in being carry'd with the stream, so here they indulge themselves in enjoying this pleasure so long, till the swiftness of the water becomes so great, that 'tis no longer possible for them to rise, but they are driven down the precipice, and perish. They are observ'd when they draw nigh the fall, to endeavour with all their might, to take wing and leave the water, but they cannot. In the months of *September* and *October*, such abundant quantities of dead water-fowl are found every morning below the Fall, on the shore, that the garrison of the fort for a long time live chiefly upon them; besides the fowl, they find also several sorts of dead fish, also deer, bears, and other animals which have tried to cross the water above the fall; the larger animals are generally found broken to pieces. Just below the fall the water is not rapid,

but goes all in circles and whirls like a boiling pot; which however doth not hinder the *Indians* going upon it in small canoes a fishing; but a little lower begins the smaller fall. When you are above the fall, and look down, your head begins to turn; the *French* who have been here 100 times, will seldom venture to look down, without at the same time keeping fast hold of some tree with one hand. 1750 Kalm

It was formerly thought impossible for any body living to come at the Island that is in the middle of the fall: but an accident that happen'd twelve years ago, or thereabouts, made it appear otherwise. The history is this. Two *Indians* of the *Six Nations* went out from Niagara fort, to hunt upon an island that is in the middle of the river, or strait, above the great fall, on which there used to be abundance of deer. They took some *French* brandy with them, from the fort, which they tasted several times as they were going over the carrying place; and when they were in the canoe, they took now and then a dram, and so went along up the strait towards the Island where they propos'd to hunt; but growing sleepy, they laid themselves down in the canoe, which getting loose drove back with the stream, farther and farther down till it came nigh that island that is in the middle of the fall. Here one of them, awakened by the noise of the fall, cries out to the other, that they were gone! yet they try'd if possible to savelife. This island was nighest, and with much working they got on shore there. At first they were glad; but when they had consider'd every thing, they thought themselves hardly in a better state than if they had gone down the fall, since they had now no other choice, than either to throw themselves down the same, or to perish with hunger. But hard necessity put them on invention. At the lower end of the island the rock is perpendicular, and no water is running there. This island has plenty of wood, they went to work directly and made a ladder or shrouds of the bark of lindentree, (which is very tough and strong,) so long 'till they could with it reach the water below; one end of this bark ladder they tied fast to a great tree

1750 Kalm

that grew at the side of the rock above the fall, and let the other end down to the water. So they went down along their new-invented stairs, and when they came to the bottom in the middle of the fall, they rested a little; and as the water next below the fall is not rapid, as beforementioned, they threw themselves out into it, thinking to swim on shore. I have said before, that one part of the fall is on one side of the island, the other on the other side. Hence it is, that the waters of the two cataracts running against each other, turn back against the rock that is just under the island. Therefore, hardly had the *Indians* began to swim, before the waves of the eddy threw them with violence against the rock from whence they came. They tried it several times, but at last grew weary; and being often thrown against the rock they were much bruis'd, and the skin of their bodies torn in many places. So they were oblig'd to climb up their stairs again to the island, not knowing what to do. After some time they perceived *Indians* on the shore, to whom they cried out. These saw and pity'd them, but gave them little hopes of help: yet they made haste down to the fort, and told the commander where two of their brethern were. He persuaded them to try all possible means of relieving the two poor *Indians;* and it was done in this manner. The water that runs on the east side of this island is shallow, especially a little above the island towards the eastern shore. The commandant caused poles to be made and pointed with iron; two *Indians* determined to walk to this island by the help of these poles, to save the other poor creatures, or perish themselves. They took leave of all their friends as if they were going to death. Each had two such poles in his hands, to set against the bottom of the stream, to keep them steady. So they went and got to the island, and having given poles to the two poor *Indians* there, they all returned safely to the main. Those two *Indians* who in the above mentioned manner were first brought to this island, are yet alive. They were nine days on the island and almost starved to death.—

Elias Borne Aloft in a Chariot of Fire

By S. Le Clerc, 1700

Now since the way to this island has been found, the *Indians* go there often to kill deer, which having tried to cross the river above the fall, were driven upon the island by the stream: but if the King of *France* would give me all *Canada*, I would not venture to go to this island; and were you to see it, Sir, I am sure you would have the same sentiment. On the west side of this island are some small islands or rocks of no consequence. The east side of the river is nearly perpendicular, the west side more sloping. In former times a part of the rock at the Fall which is on the west side of the island, hung over in such a manner, that the water which fell perpendicularly from it, left a vacancy below, so that people could go under between the rock and the water; but the prominent part some years since broke off and fell down; so that there is now no possibility of going between the falling water and the rock, as the water now runs close to it all the way down. . . . The breadth of the island at its lower end is two thirds of an Arpent, or thereabouts.— Below the Fall in the holes of the rocks, are great plenty of Eels, which the *Indians* and *French* catch with their hands without other means; I sent down two *Indian* boys, who directly came up with about twenty fine ones.— Every day, when the Sun shines, you see here from 10 o'clock in the morning to 2 in the afternoon, below the Fall, and under you, when you stand at the side over the Fall, a glorious rainbow and sometimes two rainbows, one within the other. 1750 Kalm

I was so happy to be at the Fall on a fine clear day, and it was with great delight I view'd this rainbow, which had almost all the colours you see in a rainbow in the air. The more vapours, the brighter and clearer is the rainbow. I saw it on the East side of the Fall in the bottom under the place where I stood, but above the water. When the wind carries the vapours from that place, the rainbow is gone, but appears again as soon as new vapours come. From the Fall to the landing above the Fall, where the canoes from Lake *Erie* put on shore, (or from the Fall to the upper end of the carrying-place) is half a mile.

1750
Kalm

Lower the canoes dare not come, lest they should be obliged to try the fate of the two *Indians*, and perhaps with less success. — They have often found below the Fall pieces of human bodies, perhaps of drunken Indians, that have uphappily come down the Fall. I was told at *Oswego*, that in *October*, or thereabouts, such plenty of feathers are to be found here below the Fall, that a man in a days time can gather enough of them for several beds, which feathers they said came off the birds kill'd at the Fall. I ask'd the *French*, if this was true? They told me they had never seen any such thing; but that if the feathers were pick'd off the dead birds, there might be such a quantity. The *French* told me, they had often thrown whole great trees into the water above, to see them tumble down the Fall. They went down with surprising swiftness, but could never be seen afterwards; whence it was thought there was a bottomless deep or abyss just under the Fall. I am also of Opinion, that there must be a vast deep here; yet I think if they had watched very well, they might have found the trees at some distance below the Fall. The rock of the Fall consists of a grey limestone.

Here you have, Sir, a short but exact description of this famous *Niagara* cataract: you may depend on the truth of what I write. You must excuse me if you find in my account, no extravagant wonders. I cannot make nature otherwise than I find it. I had rather it should be said of me in time to come, that I related things as they were, and that all is found to agree with my Description; than to be esteem'd a false Relater. I have seen some other things in this my journey, an account of which I know would gratify your curiosity; but time at present will not permit me to write more; and I hope shortly to see you. I am, &c.

PETER KALM.

"This is the earliest account of Niagara Falls written in English." The author was an eminent Swedish botanist. His keen observations are not only interesting but valuable. He saw the Falls 72 years after

Hennepin, but his general description corresponds with the Jesuit's account, 1750
though there was at that time no third fall. It appears from Kalm's Kalm
account that Goat Island was first reached about 1739.

1763

WILLIAMSON, PETER. The travels of Peter Williamson, among the 1763
different nations and tribes of savage Indians in America . . . Williamson
likewise, an accurate description of the Falls of Niagara . . .
Edinb.: Printed for the author, 1763. Pp. 28–37.

An account of a visit alleged to have been made to the Falls in 1746 or even earlier, but really copied from Kalm.

1764

The Falls of Niagara. 1764. From a newspaper of the day. (Mass. 1764
mag., 1790. 2:592.)

Kalm's account almost word for word! The style is a bit less personal than in Kalm's letter to his friend but otherwise the newspaper version reads like a careful revision of the earlier description.

1765

ROGERS, ROBERT, *Major*. A concise account of North America: 1765
containing a description of the several British colonies on that continent. Rogers
. . . Also of the interior, or westerly parts of the country, upon the rivers St. Lawrence, Mississipi, Christino, and the Great Lakes. . . . Lond.: J. Millan. 1765. Pp. 172–174.

Gives information concerning the location, sound and vapor of the Falls, and the destruction of animal life in them.

IZARD, RALPH. An account of a journey to Niagara, Montreal and 1765
Quebec, in 1765; or "Tis eighty years since." N. Y.: Osborn. 1846. Izard
Pp. 5–13.

An interesting account by a prominent South Carolinian, published anonymously many years later by his granddaughter. The account given is the second one thus far of a trip to the bottom of the Falls. It seems that even at this early date there was an Indian ladder for the purpose.

26th. Rode to Fort Schlosser, about fifteen miles from Niagara, which is situated on Niagara River, about two miles above the famous Falls.

1765
Izard

Mr. Pfister, a German half-pay lieutenant of the Royal Americans, lives at Fort Schlosser. He has made a contract with General Gage, commander-in-chief, to carry all stores, batteaux, etc., belonging to the army, in wagons over land, about seven miles, the Falls of Niagara making the river of that name so rapid both above and below them, that it is absolutely necessary for every thing going towards Lake Erie, to be carried that distance by land. Every batteau, besides those belonging to the army, pays him £10, New York currency, and upwards, according to their size.

Batteaux and all heavy baggage are raised to the top of an high hill on the river, by means of a capstan.

From Fort Schlosser we went to see the Falls, which are two amazing cataracts, divided by an island in the river. We were inclined to go down a steep rock and view the Falls from the bottom, but having no rope with us to fasten to a tree above, the dangerous appearance of the precipice deterred us.

A few days after, we crossed the river from Niagara Fort and rode to the Falls, which appeared much higher and more beautiful than from the opposite side.

We had got a rope, and resolved by its assistance to go to the bottom of the Falls; but some accident happening to the horse of the man who had charge of the rope, he was obliged to stop on the road, and endeavoring to overtake us, he lost his way; so we should have been a second time disappointed of the pleasure of seeing the Falls from the bottom, had we not resolved to go down at all events, without a rope. Before this resolution could be executed, it was necessary to find out a proper place from which we might make an attempt with some probability of success.

This was no easy matter; and we examined the banks of the river for at least an hour and a half before any such place could be found. Nothing but the bare face of a rock was to be seen. At last an opening appeared between some trees and bushes, which, though dangerous to go down, seemed the most likely place for our purpose of any we had seen. A council was now

held, whether an attempt should be made there. We all seemed pretty well agreed, that if any one of us would jump down a smooth perpendicular rock, about twenty feet in height, when he got to the bottom it was likely he might find a place where we might descend lower with ease. Nothing was now wanting but a mouse hardy enough to tie the bell about the cat's neck. At last one of the company, after having made one or two fruitless attempts, fixed a forked pole to the branch of a tree that hung over the rock, and by that means let himself down to the bottom. The fork of the pole broke as he was going down, and I think it is a wonder he did not break his neck. 1765 Izard

After looking about him some time, he found some notched logs, not twenty yards from the place where he had risked breaking his bones, that served as a ladder, by which the whole company went down easily to the place where he was.

We then scrambled down, holding by stumps and roots, and tufts of grass, to the bottom, and a terrible piece of work we had before we got there. Our labor, however, was in a great measure recompensed by a sight of the Falls, which appear much higher and much more beautiful than from above, on either side. We went so near, as to be wet through with the spray. After getting to the bottom of the precipice, our anxiety to be near the Falls was so great, that we forgot to mark the place where we came down; and so, after our curiosity was satisfied with looking, we were obliged to wander up and down for three hours, and scramble over many dangerous places, before we could find our way. The night approaching, gave us a comfortable prospect of staying there till morning; and the appearance of wolves' tracks in many places added much to our pleasant situation. We were informed that those animals frequently travelled about that place, in companies of about twenty or thirty at a time, and were so fierce as to attack men even in the middle of the day. As we had nothing with us to defend ourselves, nor flint and steel to make a fire, I think the odds were about five to four that no part

1765
Izard

of us except our bones would have ever got to the top of the hill, undigested, if we had not luckily found our way.

Upon the whole, our jaunt was difficult and dangerous, and although a sight of the Falls from below affords great pleasure, yet it is not adequate to the trouble and hazard necessary to the obtaining it.

The Falls of Niagara have been measured several times by a line, let down from a rock near the top of the Falls. From the best accounts I could get, I think they are about one hundred and forty feet perpendicular. They are extremely grand, and are well worth seeing.

1766

1766
Carver

CARVER, JONATHAN, *Captain.* Travels through the interior parts of North America, in the years 1766, 1767, and 1768. Lond.: J. Walter. 1778. Pp. 169–170.

This Lake (Erie) discharges its waters at the northeast end, into the River Niagara, which runs north and south, and is about thirty-six miles in length; from whence it falls into Lake Ontario. At the entrance of this river, on its eastern shore, lies Fort Niagara; and, about eighteen miles further up, those remarkable Falls which are esteemed one of the most extraordinary productions of nature at present known.

As these have been visited by so many travellers, and so frequently described, I shall omit giving a particular description of them, and only observe, that the waters by which they are supplied, after taking their rise near two thousand miles to the northwest, and passing through the Lakes Superior, Michegan, Huron, and Erie, during which they have been receiving constant accumulations, at length rush down a stupendous precipice of one hundred and forty feet perpendicular; and in a strong rapid, that extends to the distance of eight or nine miles below, fall nearly as much more: this River soon after empties itself into Lake Ontario.

The noise of these Falls might be heard an amazing way. I could plainly distinguish them in a calm morning more than

twenty miles. Others have said that at particular times, and when the wind sits fair, the sound of them reaches fifteen leagues. 1766 Carver

It would appear that even in 1766 the Falls were already very well known.

1768

The wonders of Canada. A letter from a gentleman to the Antigua Gazette, New York, August 21, 1768. (Mag. Am. hist., April, 1877. Vol. I, pt. I, pp. 243–246.) 1768

About nine miles up, on the eastern side of Niagara is an encampment of the last Indian War on Mount Pleasant, affording a most noble prospect of vast level woods, the deep rapid, meandering river, and the distant lake, bounded by the high lands beyond. At this place it is probable that the falls originally were, and broke up by slow degrees, to their present situation, which is seven miles higher, for it is still as equally level country, from the top upwards as from the foot of the mount downwards, and the banks of the river very high, especially from the mount to the falls, where I stood level with the upper bed of the river. Here it is also, that the portage of nine miles commences, to the upper landing place or little Fort Niagara, in crossing the river from whence going upward, about three miles over Midway at Navy Island, where the King's vessels for Lake Erie's navigation are built, the several inlets and surrounding woods afford a beautiful view, and looking down the river from this point of the island, in a fair, calm day, there appears a pyramidal cloud, very high, arising like the steam of a mighty furnace, from the violence of the falls forcing the spray so high, that, becoming lighter than the air, is suspended, and said to serve as a mark, in the navigation of the lakes above and below, for fifty miles. In my return, I went to the island that divides the river into an east and west branch at the Falls, which will scarcely be credited but by such as have made this tour, but it is nevertheless true: Five sturdy men under the pilotage of a Mr. Stedman who lives at the carrying-place, and had ventured there once before, conducted me thither in a batteaux, and

1768 back again, with great safety, keeping dexterously between the two streams that rush on each side, to the Falls with the rapidity of a cannon ball. Indeed the risque is great, for mistaking the Land-marks, breaking a setting pole or paddle, or even missing a single stroke, and all is lost. Faith nor all her works will protect you from perdition. But curiosity was great and I gratified it, though it add nothing particular to the view, except the precipitation of the waters down to the rapids, on each side, amid its huge rocks and a number of broken islets.

I had many views of these mighty water-falls, and was astonished and delighted at each; but the last, from the western side of the river exceeds all imagination. There are here three views, fully before both Falls (measured 136 feet high) and opposite to Stedman's Island, a precipice of about 400 yards in length and equal height with the Falls, the tall wood on the top of which having a good effect.

I first arrived at the brow of a high hill, over the upper bed of the river, the western branch of which, seen to Navy Island, about two miles up affords great diversity. The wide seemingly still water surrounded above, and on all sides, by a tall forest, then rolling an immense body down the rapids, falling tremendous, like a vast sheet of melted lead, over the middle part of a half circle, the two ends of which flowering off in thinner sheets, the eastern fall of irregular appearance, dazzling the imagination with streaming beauties of various forms. The precipice and wood between the two, altogether terrify the mind, while it is charmed into rapture; for great as the idea was which had led me so many hundred leagues, and heightened by the imperfect views taken before, it so far exceeded my most sanguine expectations, that my imagination had not immediate scope for it, and I felt distressed till my mind had expanded itself to the immensity and variety of the objects that struck it all at once.

I next went to the foot of this hill, which is level with the upper bed of the river, and all around was amazed and delighted. But new expressions are wanting.— To go on then.— From

hence I walked a mile, through a thick wood and swamp, and then descended a steep, rugged precipice, suspended by hands and feet; sometimes on notched wood, half decayed, and at others by broken points of rocks, at the verge of destruction, the idea a delirium always distresses me with, till I got to the lower bed; and scrambling about a mile over vast slippery rocks and loose stones, fallen out of the precipice, I arrived at the foot of the falls, where the immensity of the impending rush of the water, and diversity of the falls and spray, the various reflections of the sun, the regurgitations, foamings and vortices, bewilder and astonish beyond conception. . . . 1768

The best view, here below is from a projecting rock just under the bare precipice, opposite to Stedman's island. To go further, only serves to fatigue beyond measure; for under the Falls . . . the spray obstructs the sight, all is noise and confusion, one continued uproar. You are wet to the skin in a moment, and if you persist in pressing on under the sheet of water, you lose your breath by the violence of the spray, which happened to me in two attempts.

The letter is signed "A. B." The description of Niagara is prefaced by an account of the difficulties and delays of the journey thither. The whole letter is very well written and the account of Niagara is not only excellent but convincing. Especially interesting is the first-hand account of the trip to what is now known as Goat Island. Both the dangers of this trip and the difficulties of the descent to the foot of the Falls are in striking contrast with the accessibility of the Falls in our own time.

1785

(Crévecouer, Hector St. John de.) Voyage dans la haute Pensylvanie et dans l'état de New York, par un membre adoptif de la nation Oneida. Traduit et publié par l'auteur d'un cultivateur American. Paris: De Crapelet. 1801. Vol. II, pp. 148–193. 1785 Crèvecouer

"Though called a translation this is believed to be an original work by Crèvecouer." The pages relating to Niagara contain a detailed description of the Falls together with the author's reflections and emotions at the sight. He attempts to estimate the height and volume of the Falls. The account is accompanied by two plates both highly imaginary and inade-

1785 Crèvecouer

quate. The whole account is so highly embellished that it is in striking contrast with the simple and really trustworthy narrative contained in the letter quoted below.

CRÈVECOUER, HECTOR ST. JOHN DE. Description of Niagara Falls in a letter to his son under date of July, 1785. (Mag. Am. hist., Oct., 1878. Vol. II, pt. II, pp. 605–613.)

Crèvecouer's letter gives a "graphic description of the cataract as it appeared in its primeval grandeur, undisturbed by the hand of man." It is written in naive and winsome style. It gives the first account of the descent on what is now the American side and a detailed description of the descent on the Canadian side. Crèvecouer and his companion appear to have been the first persons to penetrate behind the Horseshoe Fall. By Crèvecouer's account they evidently "did" the Falls more thoroughly than they are "done" by many a modern tourist.

I must mention the perilous and dangerous descent we made [on the American side]. We had provided a strong rope which we attached to the trunk of a large tree about 40 or 50 yards from the edge of the little [American] fall. The rocks are nearly perpendicular, from the fissures of which grew a number of shrubs and plants, which served to fix our feet upon whilst we held firm by our hands on the rope. In this manner we decended nearly 150 feet, not without having experienced the greatest bodily fatigue, but also some fearful apprehensions.

. . . . .

We were desirous of crossing the river Erie [the upper Niagara] to the opposite shore, where we might see the Cataract in the best situation. The general route is to return to the landing place upon the river Niagara . . . [Lewiston], pass the river and proceed by a road through thick woods until you arrive at the Falls. We were saved this troublesome route by Mr. Jones offering us one of the Military Batteaux, with six soldiers, to put us and our horses over. . . . The river here is about 3 miles wide, the waters very deep, which conceals in some measure the rapidity of the current, which is so great that we were obliged to pole up the river close in shore for near two

miles. Our men then took to their oars and with incredible labor arrived at the other side and landed in Chippeway Creek. 1785 Crèvecouer

. . . This passage is extremely awful, for many accidents have happened from the breaking of an oar and the current running at the rate of 6 miles an hour, it requires great exertion to prevent being hurried along with it; and this is the reason they ascend the river so high, for Chippewa Creek is even lower down than Fort Slausser. The terror is increased by a full view of the rapids I have described, and the spray and cloud within two or three miles. An accident such as I have mentioned would expose persons to be driven by the current into the rapids, where you must inevitably perish. . . .

The view of this cataract from the Eastern Shore seems only preparative for that on the west side, where we now stood. I shall begin with observing, that you command here every drop of water, since there is not a curve or undented line but may be seen. We were within 30 or 40 yards of the great fall, the waters of which force themselves over these great rocks, and occasion two small falls, the waters of which washed our feet.

. . . . .

The rock we were upon, pends over at least 20 or 30 feet, and to look down makes you giddy, particularly from the agitation of your feelings.

. . . . .

We followed him [the conductor] upon the bank or ledge of rocks for a short mile. . . . We arrived at a break in the rock . . . which serves as the only admittance or path to descend to the river. This we pursued for some distance down a very steep bank, and were obliged to hold by the roots of trees and shrubs that surrounded us. We came to a large tree which stands alone . . . and upon the back of which were carved a number of names of different persons who had been here. Being fatigued we rested here some little time, and amused ourselves by adding ours to the number. We now continued our route until we came to a large rock, the sides of which are perpendicular

1785 Crèvecouer

and near 30 feet high. We were obliged to make use of an indian ladder, which is simply two straight trees in which, with their tomahawks or hatchets they cut notches at 12 or 15 inches from each other. In these notches you put your feet and by this means we got to the bottom. We now found our route more difficult, being obliged to change our course in different directions, according as we thought it could accelerate our passage, sometimes we crept on all fours for many yards together, passing through holes in the rocks, which would scarce admit our bodies. At other times we absolutely passed under the roots of trees which had been hollowed by the savages who have made this indian path in order to amuse themselves with fishing, which is a very favorite amusement. At some seasons fishes are found here in great plenty, and then many hundred savages frequent it. We had now been near an hour in descending and but a very small part of our difficulty overcome. We were arrived upon a broken shelve of rocks which had fallen from above in the spring of the year when the ice began to thaw, the rocks being loosened. It is from the expansion of the fissures which have snow and water in them during the winter, and melting in the spring of the year produces this effect. There have been instances of persons losing their lives or being lamed from the falling of these pieces, some of which would weigh many tons. At this period of the year there was little danger. We were nearly a mile and a half from the foot of the cataract, and the whole way back was strewed with these broken pieces of stone, and owing to the great declivity to the river we were in fear of falling in, as the stones sometimes gave away, and the only way to save ourselves was by laying down, by which we frequently were hurt. The pending rocks above us added much to the horrors of our situation, for knowing those under our feet had fallen at different periods, we could not divest ourselves of apprehension. However we encouraged each other with the idea of surmounting the same difficulties which others had done before us. We came at last to the two small falls which I have men-

tioned before. Being excessively fatigued and warm we sat down sometime to refresh ourselves, and prepare for advancing. Here we undressed and in our boots and trowzers, began the most hazardous expedition I was ever engaged in. 1785 Crèvecouer

After climbing over several very high and craggy rocks, we came to the first of the small falls, under which we passed without much inconvenience, though the pressure of the water was so great from the height it fell, that I can only compare it to a violent storm of hail, but when we came to the second through which our guide with difficulty passed, I felt no inclination to proceed. Our guide returned to encourage us, and upon my hands and feet I followed him, expecting each moment to sink under the weight of water, but I began to find it less disagreeable as I advanced, and I was soon relieved by enjoying the open air, which now I breathed with pleasing avidity. Here we reposed a little. My friend Hunter was entirely spent; I repented his coming, for fear of some accident, and indeed had endeavored to dissuade him from this perilous excursion, but he could not bear being left behind.

We now were recovered in some degree, and proceeded toward the great fall, and here I may say with propriety, that the most awful scene was now before me that we had yet seen. Our difficulties and dangers as well as our gratifications, had been progressive and this was the height of our ambitious pursuit. I have before remarked that the waters run over the shelve of rocks, that pend over in many places their base. The great force with which they are precipitated, gives them an horizontal direction, so that at the bottom where we stood, it left an opening between the water and the rocks. It was here we entered by slow and cautious steps. It soon became dark, which proves the immense body of water there must be betwixt us and the light, for we all know we can see a great depth in the river, and here I should imagine the light would assist in rendering it more transparent, but we found it opake or dark. We had proceeded about 15 to 20 yards, when we found it so

1785 Crèvecouer

very sultry that we might be said to be in a fumigating bath. We hastened out of this dreary place, and once more congratulating each other with our safety, and in seeing the sun whose beams seem to shine with peculiar lustre, from the pleasure and gaiety it diffused over our trembling senses.

. . . . .

I found here a kind of calcareous earth, which is called the Surf stone. It certainly derives its formation from some hidden cause proceeding from the agitation of the waters which imbibe certain cohesive particles, but I am not sufficiently acquainted with chemistry to analyze its peculiar properties.

It is dissolvable in water though formed by it, but it acquires its solidity by being thrown upon its shores and exposed to the sun and air. It seems to have many of the qualities of soap but less greasy. It may be melted by heat, but when cold becomes a solid mass again. When found it has the appearance of Derbyshire Spar or marble, is quite white but much lighter. I saw nothing else curious here. There are great numbers of snakes amongst the rocks, particularly the rattlesnake, which delights in these retired and gloomy places. We found an Indian of the Messasauga nation fishing at the mouth of the Basin. We exchanged some friendly signs and took our leaves. We could have wished for a balloon to have ascended at once, but we were obliged to toil the same way back, in which we were often constrained to repose upon the ground. We at length arrived upon the summit, and who can speak the pleasure we received from our safe return. We had been six hours and upwards descending and ascending.

1787

1787 Enys

Enys, *Captain.* Visit to Niagara. Journal of Capt. Enys, 29th regiment, 1787. (Rept. on Can. archives, 1886. Pp. ccxxvi — ccxxxiii.)

The original manuscript of Captain Enys's journal is in the Dominion archives at Ottawa. The only other publication of it beside that cited occurs in Severance's *Studies of the Niagara Frontier*, pages 363–378.

1787, *July 18th.*— From hence to Fort Slosser is about a mile & a half or two miles on a perfectly straight and good road, at which place we at length arrived, after being four hours on the road from Niagara, which is only fourteen miles. On our arrival we found dinner over but we soon got a mutton chop, which we had no sooner swallowed than we all set out to see the Falls taking Mr. Hamilton of the 53d Regiment for our guide, who having commanded Fort Slosser for some time knew his way. 1787 Enys

After passing through some fields and a small piece of wood, we came to the river side at an old saw mill, about a quarter of a mile from the brink of the Falls. This view alone is worth going many miles to see. The current, which is very strong more than three miles above the Falls, is here increased by many causes, for the river which grows naturally narrower as it approaches the brink of the cataract, is here divided by a large island in the middle; it also begins to be shallow and rocky, so that from hence quite down to the brink of the Falls the water is in a continual foam and has in many parts of the distance Falls which would be much talked of were they in any other situations, which may be easily conceived from the perpendicular height which the water falls in the course of this quarter of a mile previous to its reaching the brink of the cataract, which is at least sixty feet; this many seem to think should be added to the perpendicular height of the Falls; whether it should or no I shall not presume to determine.

I already find my pen, or at least my ideas, inadequate to give any account of what is now before me, as it is not only the water which is beautiful but the island also is covered with noble trees down quite to the edge of the water; to this we must add the many small islands which have been severed from time to time from the larger one by the force of the current, and which still partake of their parent's verdure and beauty. It was with difficulty we could prevail on ourselves to leave the place, even tho' we knew we were to go to parts infinitely more beautiful.

1787
Enys

We at length, however, struck again into the wood and, passing down its skirts, Mr. H. brought us out a few yards below the Fall. Here I for one sat down for some time in silent admiration and astonishment, at a sight which I am fully persuaded no pen or pencil can ever convey across the sea. In our present situation we were too near to the highest part of the Fall, which in a kind of a sketch or plan I have annexed is marked 1, to enjoy its full beauty, but we had a tolerable good view of the great, or as it is generally called, the Horseshoe Fall, which is here marked 4, 5, 6. To give any adequate idea of the astonishing variety which here crowds upon your mind is impossible, and it may be well said to be the real sublime and beautiful conveyed in the language of nature, infinitely more strong than the united eloquence of Pitt, Fox and Burke, even if we give them the assistance of Loutherbourg to help them.

As the water during its fall from different parts meeting the rays of the sun in different directions takes an infinite number of different colours and shades; to this we must add the numberless beautiful breaks in the water; the delightful verdure which covers the islands and neighbouring shores; the beauty of the most noble rapid which can be conceived, before it ever reaches the brink of the precipice; the astonishing column of spray which rises from the great Fall; the thundering noise which the whole makes by its fall on the heap of stones below, from whence it runs, no longer like water but absolutely in such a state of foam as to appear like a perfect river of milk, for about 100 or 150 yards, after which it resumes its natural state again, although it is still carried away by means of a strong rapid. To all this I must add the lofty banks which surround the basin into which the water falls, the tops of which are covered with noble trees quite close to the edge of these cliffs. Hence I could not help remarking to Mr. Humphrey that before my arrival I expected to have been disappointed, from having my ideas raised too high by hearing so many people join in their praise, but that I was sure from this view alone no one can say too much of it.

Here some of our party wished to go down to the bottom, a thing very soldom done on this side, as well from the difficulty of the descent as that when down your view is by no means so good as on the opposite side. It was however agreed upon to make the attempt, preparatory to which Mr. Hamilton made us all take off our shoes as in many places it is so very slippery it would have been more dangerous to attempt with them on. Our party now consisted of Mr. H. our guide, Mr. Douglas of the 65th and Mr. Brunton of the same Regiment, myself, and last of all Mr. Humphry. We all with great difficulty got down about one third part of the way. But when I saw the path by which I was to descend further I gave it up telling Mr. Humphry that if he choose to go further I would get out of his way which I accordingly did and he descended as low as I had done where like me he gave up the point. The other three gentlemen completed their design and on their return very candidly allowed, although they were well pleased with what they had done now it was over, they would by no means attempt it again until ropes or something more secure were placed in the most dangerous parts, as in some of the steepest parts they were obliged to let themselves down by means of twisted stick, in the manner of a faggot band, which was tied to an old stump above, which stick had been then in use for three years. Mr. H. indeed went further and acknowledged that on reflection when at the bottom he entertained some doubts their being able to reascend. However, they all got up safe with no other loss than the feet of their stockings which were perfectly worn out. 1787 Enys

We next went back a few yards to the brink of the Falls and found to my surprise that we could not only approach close to the top of the Falls but that the water was nearly on a level with the flat rock on which we stood, (marked 1,) that I could without the least danger stoop and take up the water with my hand after it had fallen over the precipice. The view which we have here straight over the Fall is very fine, but not so grand as the one we had before left, except that we saw the pillar of

1787 Enys

spray to greater advantage, as the Fall from whence it proceeded appeared less in this direction than the former. I do not know how long we should have stood looking at the scene before us, if the setting of the sun had not reminded us that it was time to return, on which we began to retreat. After we had returned more than a mile, on looking back from a little eminence we could see the spray of the Fall rising to an immense height above the surrounding woods, like the large column of smoke which ascends from any large building on fire, but not of so dark a colour.

Having gone a little further we came to the house of Mr. Philip Stedman where we passed an agreeable hour in company with him and his niece. As Mr. Humphry and myself had no business at the Fort, we staid a short time after the rest of the party, and were at last going in quest of our supper without any hopes of seeing any thing more of the Fall for the night. Notwithstanding it was the very middle of summer and the day had been extremely hot, the night was very cold so that we had run a good deal of the way, when stopping just before the Fort gate we saw the most beautiful as well as strange appearance, that can be well conceived. It was the moon which was now just setting behind the spray of the Falls; it appeared to rise to a very uncommon height in likeness of a very dark column, but the thinner part of the spray which admitted the light through it, gave all the edge of the column a luminous appearance which looked more like a pillar of smoke fringed round with fire, than anything I can compare it to. Not wishing to keep the sight to ourselves we ran to call the rest whom we found collected round a large fire from which we could with great difficulty draw them, as they supposed it was only a story made for the purpose of drawing them from their seats by the fire, that we might ourselves get possession of them, by which means they were not out until the moon was very near gone, when from what they saw they sincerely lamented they had been so tenacious of their seats.

This over we all returned to the Fort and after a hearty

supper we returned to Mr. Stedmans again to bed and slept very sound until past 7 oclock next morning (19th), at which time from the orders which had been given to the servants over night, I was in hopes our chair and horses were on the other side of the water; in this I was again disappointed. I next hastened to the Fort with all expedition, where I found both officers and men still in bed, from whence they were soon roused and a boat and party of men got to put the chair and horses over, which we soon sent off with orders to land them on the north side of the Chipaway Creek, whilst we, having procured Mr. Stedman's light boat, remained behind to breakfast. 1787 Enys

Breakfast being finished, we left Mr. Brunton alone at his new Government, about ten in the forenoon, and after having rowed up a mile or more under the East shore, we crossed to a very large island that lies in the middle, which having gained we rowed up under its western bank for a considerable distance before we ventured to cross to the western side of the river. At length we made our crossing good and landed about four miles above the Falls, at a farm of Mr. Stedman's; here Mr. Hamilton left us and striking to the left went to Fort Erie, whilst the rest of us taking the right-hand road after a walk of two miles came to Chipaway Creek where we found our horses at the house of a Mr. Birch, one of the principal people in the settlement. As the squire was not at home, we were glad to wave the ceremony of a visit, so as soon as our cavalry were ready we set out towards the Falls. About another mile brought us to the head of the rapid, and a short way further we came to a mill Mr. Birch has lately built; it appears to me to be a very elegant piece of workmanship, and is to be both a grist and saw mill, but I am very much afraid from the rapids above it he will find it difficult, if not dangerous, to bring down boats and rafts to it, although the man who superintends it says he thinks it may be done with ease when they become better acquainted with the currents.

About 100 yards below the mill, from a point that projects a little, we had a most delightful view of the whole rapid, which

1787 Enys

is near a mile in length and I should think three times as broad as that on the east side; the numerous falls are large in proportion, which of course renders it infinitely more grand than the one we had seen the evening before, but still it wanted those beautiful little islands with which the smaller one is adorned. In the course of this long rapid I conceive the perpendicular fall of the water is not less than 100 feet before it reaches the brink of the Fall, and so full is it of rocks and cascades that I conceive it utterly impossible that any boat can ever get down to the Fall without being overset; indeed some of the 29th Regiment whilst in these parts sent down an old boat for the purpose of seeing it go over the Fall. They went themselves below the Falls to look out for it, whilst they left men on the different points to make signals when it passed them, but some of those near the Fall nor the Gentlemen at the bottom never saw anything more of it.

As the day was now advancing, we could not stay so long here as I could have wished for fear of being stinted in time at the Fall itself, for which we now set off, and very soon reached the nearest house to it and got permission from Mr. Elsworth the owner to put our horses in his stable; but all the family being busy carrying their corn we could get no one to go with us. However, as Mr. Humphry had been here before, he undertook to guide us, and we accordingly set out under his directions. Not far from the house we came to the edge of a very steep bank, which we descended through a very deep ravine or gully, not without some dread of rattlesnakes, for whose habitation this place seemed particularly suited and the pass being so very narrow and full of stones and stumps, that had any such thing been there it would be difficult to avoid it. After going some distance we got to the bottom of this nasty place and found ourselves again on level ground, which took us to the brink of the Fall at a place from its appearance called the Table rock, over a part of which the water rolls. This being the nearest part to the Great Fall, you are of course almost stunned with its noise

and perfectly wet with the continual mist arising from the bottom, in form of the pillar, which having gained a sufficient height is separated by the wind and falls like small rain or mist. From hence we had a much better view of the Falls than that which we had the preceding evening, but like that we were too near the object to see it to perfection. I am told many people think this is the best view in which you can place the Fall, but I rather think it can only be such as have never given themselves the trouble to search for any other. Here, they say, you can likewise dip up the water after it has passed the brink of the precipice. However true this may be, it is not so perfectly so as on the opposite side, as here it is only a small branch of the Fall you approach; on the other side it is actually the main body of water itself, as may be seen in the little sketch of the top of the Fall before given; the former or Fort Slosser side being marked 1 in the plan; I am now speaking of 8. The Table Rock is a very large flat rock projecting from the bank and overhanging its base very much, by which means it forms one of the best modes of determining the height of the Fall, being exactly upon the same level and projecting so much that a line let down from its summit will drop very nearly at the water's edge at the bottom. But whatever methods may have been taken to ascertain its height, that of both sides is very well determined, being agreed by all hands to be 170 feet on the east, or Fort Slosser side, whilst from the Table Rock it is only 140, but this 30 feet if it is taken from the perpendicular of the Fall adds to the noble rapid that is above it. 1787 Enys

Having staid a long while we at length set off from hence, hoping to find a way to a point not many hundred yards below where we now were, without returning to the top of the bank again; in this, however, we were disappointed, finding the brake too thick and the ground too swampy to admit of our passage, although I hear there is a possibility of going to those who are acquainted with the place. This was not our case, so we were obliged to ascend the gully by which we came, at the top of

1787 Enys

which we turned off to the right and soon found a path leading to another gully of the same kind, through which we a second time descended the bank. Having got down to the level ground, we could find no kind of path; we therefore marked the trees as we went, thinking they might serve us as a guide on our return. Thus, guided by the noise of the Falls more than any thing else, we soon came to the brink of the clift and striking off a little to our left found the place we were in search of, and which I believe is now called Painter's Point, from a man of that name in whose ground it is. Here we found a spot which had been in some measure cleared (by Lieutenant Tinling of the 29th when he was acting Engineer at Niagara) on purpose to give you a good view of the whole of this grand object at once, and it most certainly is the best view of any on a level with the Fall, as here every part is by far more equidistant than in any other point you can look at it from. From hence you look directly against the island which is in the centre, having the Great Fall to the right and the smaller one to the left; from this place you have also a better view of a small Fall on the east side of Goat Island which is called the Montmorrency Fall, and which is said to disembogue more water in the course of a year than the famous fall of that name near Quebec, which perhaps it may, but I do not think it is so broad as that Fall. Perhaps its very diminutive appearance here may be only occasioned by its being placed in the midst of such astonishing large ones, as the nearest computation that has ever been made allows the breadth of the Fall from one side to the other to be 1,300 yards, including all the turns which there are in its summit and the island in the centre; which last may be something more than 100 yards broad.

I could willingly have staid here much longer than we did but having determined to go down to the bottom we were obliged to hasten towards the place where you descend. This place lies some hundred yards to the left of Painter's Point, from which you pass all the way on the brink of the precipice, nor is it easy to find the opening unless you are acquainted with it, as you pass round

a small bush where you find some stumps and roots which assist you for the first three or four yards of a very steep bank, when you come to a place quite perpendicular for perhaps about twelve feet. Here they have put what they call Indian-ladders, which is no more than a tree about a foot in diameter with notches cut in its sides that is placed rather slantwise to answer the purpose of going down. Not far after you pass the first of these ladders, you come to a second, not quite so long, after which you descend through a very steep gully full of rocks and stumps, most part of the way being assisted by the branches of the neighbouring trees. It surprised me to find that the descent was so easy to what I had always been led to think it, which I conceive proceeds from many who have never tried it but speak from hearsay; indeed I am fully persuaded that many who say they have been at the bottom never have been there, as they are frequently betrayed by the erroneous accounts they give of the lower region, which in fact is, I believe, visited by but few. 1787 Enys

Once arrived at the bottom, you receive ample reward for the pains the descent has occasioned you. If this noble scene inspire you with awe when above, it may be easily conceived how much it must be augmented when you get to the bottom, absolutely into the very basin whence all this sheet of water falls. You are no sooner clear of the wood than you have a full and complete view of all the magnificent scene, in which all the various shades which the water receives in its fall, either from the projecting rocks or from the intersection of the rays of the sun, appear to the greatest of all possible advantage; besides which you here see nothing of the rapid above, your prospect being confined to the perpendicular fall and the basin which receives it, but then that fall appears to much greater advantage and much higher than it does from any of the views above.

Having sat down a few minutes to rest after our descent and drank a glass or two of wine, we proceeded to get as near the Fall as we conveniently could. This is by far the most difficult and, I may add, dangerous part of the day's journey. The dis-

1787 Enys

tance from hence to the Fall is very considerable and you have no kind of road, the way lying along the beach, which is formed of large stones which have from to time fallen from the high clifts which overhang most part of the way. These rocks lie just as they happen to have fallen, so that sometimes you are obliged to climb over them, at others to creep under them, whilst they seem to threaten your destruction every step you take; many of them appear as if they would fall every moment, being only ballanced on a point, others seem to have no other support than trees which have fallen at the same time with themselves, which appear very slight supporters for such immense masses of stone; then as the apertures among these rocks are not large enough to admit of your walking through, you are obliged to creep through them on your hands and knees, or slide through them on your back, every moment in danger of meeting with either a water or rattle snake, for both of which this place is very remarkable, particularly the latter, and the very best part of the road lies over a parcel of large round stones that slide under your feet. Notwithstanding all these dangers, such is the beauty of the surrounding prospect and such the pleasing kind of awe which I felt at the time, that it never once struck my mind that I was in the least danger until the whole was over and we had got back again to the entrance of the wood.

But to return to my tale. Having scrambled over these rocks until we got pretty near the Fall, we found the spray begin to fall like hard rain. Here Mr. Humphry stopped, but Mr. Douglas and myself went on until we got within about Twenty yards of the Falls. Here we were in some doubt whether or no we should strip and go as far as we could under the Fall; this we however at length rejected, as we never found any one pretends to have gone further than under the first small shoot, which we thought unworthy the trouble of undressing for, there are reports of people that have gone under the great shoot but who they were I could not learn, although I have examined several who asserted they had been under the Falls of Niagara, yet, when

questioned closely upon the subject, it appeared to have been only the small spout they had been under. Yet I by no means mean to assert there is not that kind of cavity betwixt the under part of the rock and the fall itself, that would admit of a man going under for some distance. On the contrary from the Table Rock being so very much undermined near its base, I conceive it to be highly probable the rock over which the Fall rolls is the same, but as the falling of the spray is so very thick and troublesome as to prevent your seeing and almost to prevent your breathing even where we were, I do not conceive it is possible for a man to exist under the great shoot itself. 1787 Enys

However, we did not advance thus far without finding something which had so far as I could find never been spoken of before. Within a few yards of the place we turned round, I could perceive a very strong smell of sulphur, which I remarked to Mr. Douglas and on further examination we perceived a small rill which descended from the rocks above and all the stones over which it passed seemed covered with a whitish kind of slime. This induced me to taste the water, which I found to be exactly the same as the water at Harrowgate, in Yorkshire. Mr. Douglas also tasted of the same water and directly exclaimed, "it is just like the washings of a gun barrel," although he declares he had never heard the Harrowgate water compared to that mixture.

Having staid here for some time contemplating the grandeur of the object before us, our time passed away insensibly until we found by our watches that it was high time we should turn our backs upon the scene from which we had received so much delight. On our return we employed ourselves in picking up a kind of stone which is said to be the spray of the Fall petrified, but whether it is or no, I will not pretend to determine; this much I can say, that it grows or forms itself in cavities in the clift about half way to the top, from whence it falls from time to time; its composition is a good deal like a piece of white marble which has been burnt in the fire, so that it may be pulverized with ease. Whatever may be its composition, it does not appear that

1787 Enys

it will bear to be exposed to the air, as some pieces which seem to have fallen longer than the rest are quite soft, while such as have lately fallen are of a much harder nature.

Having again made our way back to the edge of the wood where we were to reascend, we sat down to take some refreshment, very well satisfied to have seen everything worth our notice except the rainbow, which very often forms itself in the spray. During the time we were lamenting the loss of this object, it made its appearance in a most perfect state across the highest part of the Fall, which made our sight of this place as complete as possible.

We now began our ascent and after again visiting Painter's Point, in our way we came to the place where we had marked the trees; we found one or two of the first but had done it so very ill that we could not trace our way back by them. We therefore struck into the wood and endeavoured to keep the sound of the Falls directly behind us, by which means we found our way by a much nearer route than the one we had descended, from which we again soon reached the house we had left our horses at, after an absence of five hours and a half, from which time we had been employed walking about the place.

It may not be improper here to take notice of an opinion which is held by some people of this place, who seem to think the original situation of the Falls was at the landing, which as before observed is seven miles from where they now are, and that through a series of years the water has worn away the channel that distance. Among those who favour this opinion is a Mr. Hamilton, a merchant at Niagara and a man of very good understanding, who says also that he has examined the face of the adjacent country, which has confirmed his opinion, and in particular conceives the place which has before been taken notice of by the name of the Lion's Den, to have been made by a channel of the river formerly passing through it. How far this may be true I do not know; I did not hear this opinion until after I had seen the place, at which time no such idea ever entered my

head. The principal reasons they seem to give for this opinion are two: First, from the abrupt rise of the banks of the river at the Landing, which from being of a moderate height and almost every where accessible from the water's edge, they become at once very high and perpendicular clifts; at the same time the river becomes much more narrow and rapid than before — The second reason seems to have more reason in it, and is, that according to their language the Falls have altered their position or retreated since the memory of men. Having made all the inquiries I could concerning this movement, I found that about twenty years since, there was a projecting rock at the end of the centre island which had fallen and seems to be the only ground work for this strong contested opinion. One thing I must grant, that it is possible that in a very long series of years they may alter a little and for this reason: the spray rising from the bottom continually striking against the clifts wears it away and forms a kind of cavity over which a large rock projects, as the Table Rock already mentioned, which, when it becomes so undermined that it is not able to sustain the weight of water which overflows it in great floods, must naturally fall. How long it may take the water to excavate its clifts in this manner I cannot determine; all I can say is, the place where the rock fell twenty years ago does not yet appear to be the least worn by its influence, nor does any one pretend to remember the Table Rock any other than it now is, projecting very far over its base. By which I conceive we may fairly conclude it will take many centuries to bring about this revolution, which when done only alters one small part of the Fall for a yard or two. At that rate, how long it would have taken to have retreated from the landing I shall leave to those who pretend from such causes to ascertain the age of our terrestrial globe. But even if we should for a moment grant the possibility of their favourite maxim, what is become of the immense quantity of stone, which must from time to time have fallen during its movement. This seems to me to be a question none can answer, certain a great quantity of stone must have been in a

1787 Enys

1787
Enys

channel above seven miles long and from a half to a whole mile broad, and from seventy to eighty feet deep. Had it fallen in such quantities as it is natural to suppose it is very strange the fall should keep its present perpendicular form; it is by far more natural to think had this been the case that these immense rocks, reposing where they fell, would have altered the Fall from a perpendicular to a strong rapid. But say the advocators for this opinion, the force of the water has driven them away from its foot. This may also be true in a small measure, for where it is, the rocky part of the river would not break off so abruptly just at the same place where the mountain ends, which is at present the case, for not more than two hundred yards from the end of this rocky rapid part which is the spot they say the Fall originally occupied, the River expands itself and becomes deep, muddy and tranquil, which course it continues for about 9 miles by the water to the mouth, the outside of which is encumbered with a bar of sand.

I also when at the Fall observed another circumstance which seems to be against their having been once so far down the river. Below the present situation of them is a circle of more than a quarter perhaps a mile or more in diameter whilst the outlet is not so wide. I conceive this part has been widened by the same means the Falls have retired, as when you get beyond the influence of the spray the river assumes its natural breadth. Speaking to Mr. Birch, who lives at the mouth of the Chipaway Creek, he said he had perceived a regular flux and reflux in the Creek resembling the tide of the Sea. Mr. Hamilton who I have before mentioned, says it is not a regular flux or reflux at all, but that occasionally the current runs up instead of down, and what appears at first more extraordinary is, that the Creek has its source to the West and runs to the Eastward yet it is a Westerly or a wind directly down the Creek which occasions the Current to run up it to the Westward. This he accounted for in some measure to my satisfaction. It is well known that Lake Erie is to the Westward of this place in which a Westerly wind has great powers and

driving its waters into this its outlet meets with no resistance until it comes to the Falls where not being able to empty itself so fast as it comes from the Lake it causes the waters above the rapids to rise. Now this Creek being a dead swampy Creek, just above the rapid, some of the repulsed water forces itself into it and counteracting its own current favours one of the contrary way. 1787 Enys

This is perhaps the most detailed account thus far. Of especial interest are the author's speculations on the recession of the falls. It appears that in Enys's time industry had already intruded into the primeval solitude on the banks of the Niagara.

1787

SHARAN, JAMES. The adventures of James Sharan: compiled from the Journal, written during his voyages and travels in the four quarters of the globe. Balt.: Dobbin & Murphy. 1808. Pp. 108–116. 1787 Sharan

Sharan seems to have been a sailor, wheelwright, and itinerant trader of an adventurous disposition. It was while he was in New Orleans in the spring of 1787 that he resolved "to penetrate into the United States by a course up the river Mississippi, and endeavor to find his way through the forests and Indian tribes until he had seen that wonder, the Falls of Niagara." By his own account, he apparently attained his journey's end in the summer or autumn of 1787. As it happens, however, his account is so obviously taken from Kalm that it is hard to accept his story.

1789

MOORE, THOMAS. The life and death of Lord Edward Fitzgerald. Lond.: Longman, Rees, Orme, Brown and Green. 1831. Pp. 144–145. 1789 Moore

The Irish patriot was at Niagara in May, 1789. What he has to say concerning the Falls may be found in a letter to his mother, headed "Fort Erie, June 1, 1789." Though he found description impossible, it is evident from his letter that he was much impressed with "the greenness and tranquility of everything about, the quiet of the immense forests around, compared with the violence of all that is close to the Falls."

POWELL, ANN. Journal of a tour from Montreal to Detroit, 1789, with notes by Eliza Susan Quincy. (Mag. Am. hist., July, 1880. Vol. V, pp. 37–46.) 1789 Powell

A journey to Niagara in 1789 was a trip through the wilderness, whatever the route by which it was approached. Miss Powell's journal

1789 Powell

is a graphic description of the difficulties and inconveniences of travel in her day. It is interesting reading and of the greatest value historically, not only for the light which it throws upon the general state of the country about Niagara and for the description of the Falls, but for the information which it contains relative to the Indians whom Miss Powell was so fortunate as to see in council assembled on the present site of Buffalo and for evidence as to conditions on the Niagara frontier just after the Revolution.

The fort [Niagara] is by no means pleasantly situated. It is built close upon the Lake, which gains upon its foundations so fast, that in a few years they must be overflowed. . . . Several gentlemen offered to escort us to the landing, which is eight miles from Fort Erie.

There the Niagara river becomes impassable, and all the luggage was drawn up a steep hill in a cradle, a machine I never saw before. We walked up the hill, and were conducted to a good garden with an arbor in it, where we found a cloth laid for dinner, which was provided for us by the officers of the post.

After dinner we went on seven miles to Fort Schlosher. The road was good, the weather charming, and this was the only opportunity we should have of seeing the Falls. All our party collected half a mile above the Falls, and walked down to them. I was in raptures all the way. The Falls I had heard of forever, but no one had mentioned the Rapids!

For half a mile the river comes foaming down immense rocks, some of them forming cascades 30 or 40 feet high! The banks are covered with woods, as are a number of Islands, some of them very high out of the water. One in the centre of the river, runs out into a point, and seems to divide the Falls, which would otherwise be quite across the river, into the form of a crescent.

I believe no mind can form an idea of the immensity of the body of water, or the rapidity with which it hurries down. The height is 180 feet, and long before it reaches the bottom, it loses all appearance of a liquid. The spray rises like light summer clouds, and when the rays of the sun are reflected through it,

NIAGARA CATARACT

Early French print, evidently based on Hennepin. Date uncertain, probably middle of the eighteenth century

they form innumerable rainbows, but the sun was not in a situation to show this effect when we were there. 1789 Powell

One thing I could find nobody to explain to me, which is, the stillness of the water at the bottom of the Falls; it is as smooth as a lake, for half a mile, deep and narrow, the banks very high and steep, with trees hanging over them. I was never before sensible of the power of scenery, nor did I suppose the eye could carry to the mind such strange emotions of pleasure, wonder and solemnity.

For a time every other impression was erased from my memory! Had I been left to myself, I am convinced I should not have thought of moving whilst there was light to distinguish objects.

ELLICOTT, ANDREW. Description of the Falls of Niagara. (Columbian mag., June, 1790. 4:331–332.) 1789 Ellicott

The description in question occurs in a letter to Dr. Benjamin Rush of Philadelphia, under date of December 10, 1789. It was widely printed in American and European magazines. Its importance as a contribution to the literature of the Falls in the eighteenth century is well indicated in the following quotation from General Charles B. Stewart's biographical sketch of Ellicott: " It was while making the transverse of the Canadian side of the Niagara River in 1790, that Andrew, Joseph and Benjamin Ellicott first saw the Falls of Niagara; and that Joseph and Benjamin, as the assistants of Andrew Ellicott, made the first actual measurement of the entire length of Niagara River, the respective falls of the river from Lake Erie to Lake Ontario, the height of the Great Falls, and the descent of the Rapids. Andrew Ellicott, in making his report of the survey of the boundary line, makes mention of these measurements of the river, which have ever since been the acknowledged authorities in all books giving an account of Niagara Falls."

Dear Sir,

Among the many natural curiosities which this country affords, the cataract of Niagara is infinitely the greatest. In order to have a tolerable idea of this stupendous fall of water, it will be necessary to conceive that part of the country in which lake Erie is situated, to be elevated above that which contains lake Ontario,

1789
Ellicott

about three hundred feet. The slope which separates the upper and the lower country, is generally very steep, and in many places almost perpendicular. It is formed by horizontal strata of stone, great part of which is what we commonly call lime stone. The slope may be traced from the north side of lake Ontario, near the bay of Toronto, round the west end of the lake; thence its direction is generally east; between lake Ontario, and lake Erie it crosses the strait of Niagara, and the Cheneseco river, after which it becomes lost in the country towards the Seneca Lake. It is to this slope that our country is indebted, both for the cataract of Niagara and the great falls of the Cheneseco.

The cataract of Niagara was formerly down at the northern side of the slope, near to that place, which is now known by the name of the Landing; but from the great quantity of water, and the distance which it falls, the solid stone is worn away, for about seven miles, up towards lake Erie, and a chasm is formed which no person can approach without horror.

Down this chasm the water rushes with a most astonishing velocity, after it makes the great pitch. In going up the road near this chasm, the fancy is constantly engaged in the contemplation of the most romantick and awful prospects imaginable, till at length, the eye catches the falls — the imagination is instantly arrested, and you admire in silence! The river is about one hundred and thirty-five poles wide, at the falls, and the perpendicular pitch one hundred and fifty feet; . . . to these add fifty-eight feet, which the water falls, and we have two hundred and seventy-three feet, which the water falls in a distance of about seven miles and a half. If either ducks or geese inadvertently alight in the rapids above the great cataract, they are incapable of getting on the wing again, and are instantly hurried to destruction.

There is one appearance at this cataract worthy of some attention, and which I do not remember to have seen noted by any writer. Just below the great pitch, the water and foam may be seen puffed up in spherical figures, nearly as large as common

cocks of hay; they burst at the top, and project a column of spray to a prodigious height; they then subside, and are succeeded by others, which burst in like manner. 1789 Ellicott

This appearance is most conspicuous about halfway between the island, that divides the falls, and the west side of the strait, where the largest column of water descends. I am, etc.,

Niagara, Dec. 10th, 1789. Andrew Ellicott.

1791

CAMPBELL, PATRICK. Travels in the interior inhabited parts of North America. In the years 1791 and 1792 . . . Edinb.: Guthrie. 1793. Pp. 174–176. 1791 Campbell

The author travelled through Canada and the Lower Lake region in 1791–1792 spending some time on the Niagara. His book is very rare and a most valuable "source" in some respects. Unfortunately for our purposes, however, he contented himself with Ellicott's figures and the following brief passage.

A description of these tremendous falls has been so often attempted by preceding travellers, without giving the least idea adequate to the grandeur of the scene, that, lest I split on the same rock, I will not essay it here; I shall therefore only remark, that there is an island of a mile or two long, and about a quarter broad, which divides the stream about two-thirds over. This island is clad with poor spruce pine, and so overrun with Rattlesnakes, that it was dangerous for any person to walk through it, until a parcel of Swine were put on it, which nearly rooted them out. Hogs are so fond of Snakes, that if once they get a hold, should they be so hard bitten by a strong Rattlesnake as to make them squeel, which sometimes happens, yet they hold fast until the Snake is devoured. It is said a Hog sometimes swells when severely bitten by a Rattlesnake, but that a crevice bursts open between the hoofs, through which the venom is discharged, the swelling subsides, and the Hog soon becomes as well as formerly.

CHATEAUBRIAND, FRANÇOIS AUGUSTÉ RENE, *Vicomte de.* Travels in America and Italy. Lond.: Colburn. 1828. Vol. I, pp. 131–134. 1791 Chateaubriand

1791 Chateaubriand

The illustrious Frenchman was probably at Niagara sometime in 1791 and evidently had an adventurous time there. He has written several other Niagara accounts besides the one cited, but these are so highly literary that they are hardly to be included in the records of actual travel. They are more appropriately reserved for the chapter on the fiction of Niagara.

1792

1792 Ingraham

(INGRAHAM, DUNCAN.) Extract from a letter from a gentleman upon his return from Niagara. (Mass. hist. soc., 1792. Vol 1, p. 287; *or* O'Callaghan: Doc. hist. of State of New York. Albany. 1849. Vol. II, p. 1110.)

> I visited the great curiosity, the falls, and must refer you to Mr. Ellicott's account of them in the *Columbian Magazine* for June, 1790.

The scanty notice just quoted occurs in a letter dated August 8, 1792. The letter is quite a long one and contains much valuable information concerning the condition of the country and the difficulty of getting to Niagara at that time.

1792 Simcoe

SIMCOE, *Mrs.* E. P. G. The diary of Mrs. John Graves Simcoe. . . . Toronto: Briggs. 1911. Pp. 127–128.

Bits in chatty, interesting style, illustrated with views in water-color by Mrs. Simcoe.

1793

1793 Lincoln

LINCOLN, BENJAMIN. Journal of a treaty held in 1793, with the Indian tribes north-west of the Ohio, by Commissioners of the United States. (Mass. hist. soc., collec, 3d ser, 5:122–125.)

The author was one of the three commissioners nominated by President Washington to treat with the Indians of the Northwest. It appears that he was at Niagara in May and June, 1793. He is the first of the great host who at one time and another have put on record their disappointment in the Falls.

> *June* 9. Dined with Mr. Hamilton at the Landing, (Queenstown). Towards evening we left his house, and rode as far as the Falls, where we lodged, nine miles. There are a number of new settlements on the road, and one small meeting-house. The lands are generally covered with white oak, but they are neither strong or well improved.

June 10. In the morning I went to view the Falls of Niagara, of which so much has been said. The appearance was far short of the ideas I had formed of them. It is said that the water falls one hundred and thirty-seven feet perpendicularly. Had I been called to give an opinion respecting the fall, I should not have judged that the water fell more than forty or fifty feet. From whence arises the deception, I know not; the fact as to the magnitude of the fall, I cannot doubt, as that has been accurately taken, mathematically. After breakfast we pursued our journey towards Buffalo Creek, a few miles up which lives a number of the Seneca tribe. We found in our route a bad road, the lands flat, and a great proportion of the timber white oak. Near Lake Erie we found both better. The land generally, for the distance of fifteen or twenty miles, is about seven feet above the waters, between the Falls and Lake Erie, at this dry season of the year; sometimes the water must be much nearer the surface of the earth. On finding that we could not cross the ferry, the waters which divide the United States from the Province of Upper Canada, we lodged about three miles below the ferry. 1793 Lincoln

June 15. Col. Pickering, Mr. Dean, and myself crossed the river, and went to Fort Slauser, eight miles above Queenstown, on the opposite side of the river, and just above the Falls. At this place the goods, after being taken across land from what is called the Landing, were re-shipped and carried into Lake Erie, and thence on to Detroit. Since this side is in the limits of the United States, the British have made a way on the west side of the communication between the lakes. All goods must be carried by the Falls ten miles on one side, or eight on the other (U. S.). At Fort Slauser, where there is a corporal's guard, we found Mr. Stedman, whose attentions and friendship were such as could not fail to make our stay with him very agreeable.

We went towards evening to visit the Falls on the east side; we had seen them before on the west. Here we could approach them on the same level with the water when it rolled over the tops of the rocks. In this situation the fall appeared greater to me, than

1793
Lincoln

when I viewed it on the opposite side; for there I was on an eminence nearly one hundred feet above the level of the water. When on the east side, in looking down the bank on which I stood, the distance magnified exceedingly. I cannot account for the deception when observing the Falls, unless it springs from their length, or from our viewing them through a cloud; which we always do; for the vapor constantly ascends, and has the appearance of a cloud, at the distance of many miles. The water falls fifty-seven feet in the distance of one mile before it falls perpendicularly. It is generally believed here, that the Falls were six miles lower down than what they now are, and that the change has been produced by the constant operation of the water. This idea led me to examine, as well as I could, the banks of the river, on one side and the other; but did not discover any marks of the operation of the water on the rocks. I therefore could not adopt fully the opinion; and I cannot now avoid doubting the truth of the observation, unless I sacrifice my reason to wild and uncertain conjecture. . . .

We returned toward evening to the house of our friend, Mr. Stedman. . . . In conversation with our friend Stedman, who lives just on the bank of the river, respecting his keeping geese and ducks so near the Falls, down which they are liable to be carried with the rapid current, he said they had discovered a method which prevented them from swimming far from the shore, or remaining long in the water at any time, by picking off from the breast all the feathers and down, a place about the circumference of a dollar.

June 26. We left our lodgings at Governor Simcoe's. . . . We arrived in the evening at the Landing, where we lodged. The common cherries and the currants are now ripe enough to eat.

June 27. This day we left the Landing, and travelled to Chippewa, ten miles; here we waited until our baggage could be forwarded. On my way to this place I again visited the Falls. I went down to what is called the Table Rock, nearly on a leved with the water, where it falls in its greatest degree.

It did not appear to me, notwithstanding the advantageous situation in which I placed myself, that the water fell so much as fifty feet; the appearance was very like, as to distance, the water falling from a very high three-story house. A gentleman with me, who had rode four hundred miles to see the Falls, was very much of the same opinion. As I observed before, there is a constant vapor ascending, caused by the violent agitation of the water. Through this, when the sun shines, you discover the rainbow. The water falls with such weight into deep water that there is very little current on the surface of the water near the Falls, not so great as to prevent your passing with a canoe across the river. 1793 Lincoln

1796

WELD, ISAAC. Travels through the States of North America, and the provinces of Upper and Lower Canada, during the years 1795, 1796, and 1797. Lond.: Stockdale. 1799. Pp. 308–323. 1796 Weld

Weld came to the Falls in September, 1796. His book was extremely popular and his description of Niagara Falls much quoted. Weld travelled in a leisurely manner and observed carefully and with an artist's eye the beauties of the landscape. His account is not only concise but thoroughly readable and altogether one of the most valuable Niagara Falls records we have.

Fort Chippeway, September.

At the distance of eighteen miles from the town of Niagara or Newark, are those remarkable Falls in Niagara River, which may justly be ranked amongst the greatest natural curiosities in the known world. The road leading from Lake Ontario to Lake Erie runs within a few hundred yards of them. . . .

From the sudden change of the face of the country in the neighbourhood of Queenstown, and the equally sudden change in the river with respect to its breadth, depth, and current, conjectures have been formed, that the great falls of the river must originally have been situated at the spot where the waters are so abruptly contracted between the hills; and indeed it is highly probable that this was the case, for it is a fact well ascertained, that the falls have receded very considerably since they were first

1796
Weld

visited by Europeans, and that they are still receding every year; but of this I shall have occasion to speak more particularly presently.

It was at an early hour of the day that we left the town of Niagara or Newark, accompanied by the attorney general and an officer of the British engineers, in order to visit these stupendous falls. Every step that we advanced toward them, our expectations rose to a higher pitch; our eyes were continually on the look out for the column of white mist which hovers over them; and an hundred times, I believe, did we stop our carriage in hopes of hearing their thundering sound; neither, however, was the mist to be seen, nor the sound to be heard, when we came to the foot of the hills; nor after having crossed over them, were our eyes or ears more gratified. This occasioned no inconsiderable disappointment, and we could not but express our doubts to each other, that the wondrous accounts we had so frequently heard of the falls were without foundation, and calculated merely to impose on the minds of credulous people that inhabited a distant part of the world. These doubts were nearly confirmed, when we found that, after having approached within half a mile of the place, the mist was but just discernible, and that the sound even then was not to be heard; yet it is nevertheless strictly true, that the tremendous noise of the falls may be distinctly heard, at times, at the distance of forty miles; and the cloud formed from the spray may be seen even still farther off; but it is only when the air is very clear, and there is a fine blue sky, which however are very common occurrences in this country, that the cloud can be seen at such a great distance. The hearing of the sound of the falls afar off also depends upon the state of the atmosphere; it is observed, that the sound can be heard at the greatest distance, just before a heavy fall of rain, and when the wind is in a favourable point to convey the sound toward the listener; the day on which we first approached the falls was thick and cloudy.

On that part of the road leading to Lake Erie which draws nearest to the falls, there is a small village, consisting of about

half a dozen straggling houses: here we alighted, and having disposed of our horses, and made a slight repast, in order to prepare us for the fatigue we had to go through, we crossed over some fields towards a deep hollow place surrounded with large trees, from the bottom of which issued thick volumes of whitish mist, that had much the appearance of smoke rising from large heaps of burning weeds. Having come to the edge of this hollow place, we descended a steep bank of about fifty yards, and then walking for some distance over a wet marshy piece of ground, covered with thick bushes, at last came to the Table Rock, so called from the remarkable flatness of its surface, and its bearing some similitude to a table. This rock is situated a little to the front of the great fall, above the top of which it is elevated above forty feet. The view from it is truly sublime; but before I attempt to give any idea of the nature of this view, it will be necessary to take a more general survey of the river and falls. 1796 Weld

Niagara River issues from the eastern extremity of Lake Erie, and after a course of thirty-six miles discharges itself into Lake Ontario, as has already been mentioned. For the first few miles from Lake Erie, the breadth of the river is about three hundred yards, and it is deep enough for vessels drawing nine or ten feet water; but the current is so extremely rapid and irregular, and the channel so intricate, on account of the numberless large rocks in different places, that no other vessels than bateaux ever attempt to pass along it. As you proceed downward the river widens, no rocks are to be seen either along the shores or in the channel, and the waters glide smoothly along, though the current continues very strong. The river runs thus evenly, and is navigable with safety for bateaux as far as Fort Chippeway, which is about three miles above the falls; but here the bed of it again becomes rocky, and the waters are violently agitated by passing down successive rapids, so much so indeed, that were a boat by any chance to be carried but a little way beyond Chippeway, where people usually stop, nothing could save it from being dashed to pieces long before it came to the falls. With such

1796 Weld

astonishing impetuosity do the waves break on the rocks in these rapids, that the mere sight of them from the top of the banks is sufficient to make you shudder. I must in this place, however, observe, that it is only on each side of the river that the waters are so much troubled; in the middle of it, though the current is also there uncommonly swift, yet the breakers are not so dangerous but boats may pass down, if dexterously managed, to an island which divides the river at the very falls. To go down to this island it is necessary to set off at some distance above Chippeway, where the current is even, and to keep exactly in the middle of the river the whole way thither; if the boats were suffered to get out of their course ever so little, either to the right or left, it would be impossible to stem the current, and bring them again into it; they would be irresistibly carried towards the falls, and destruction must inevitably follow. In returning from the island there is still more difficulty and danger than in going to it. Notwithstanding these circumstances, numbers of persons have the foolhardiness to proceed to this island, merely for the sake of beholding the falls from the opposite side of it, or for the sake of having in their power to say that they had been upon it.

The river forces its way amidst the rocks with redoubled impetuosity, as it approaches towards the falls; at last coming to the brink of the tremendous precipice, it tumbles headlong to the bottom, without meeting with any interruption from rocks in its descent. Just at the precipice the river takes a considerable bend to the right, and the line of the falls, instead of extending from bank to bank in the shortest direction, runs obliquely across. The width of the falls is considerably greater than the width of the river, admeasured some way below the precipice; . . . you will see that the river does not rush down the precipice in one unbroken sheet, but that it is divided by islands into three distinct collateral falls. The most stupendous of these is that on the north western or British side of the river, commonly called the Great, or Horse-shoe Fall, from its bearing some resemblance to the shape of a horse shoe. The height of this is only

one hundred and forty-two feet, whereas the others are each one hundred and sixty feet high; but to its inferior height it is indebted principally for its grandeur; the precipice, and of course the bed of the river above it, being so much lower at the one side than at the other, by far the greater part of the water of the river finds its way to the low side, and rushes down with greater velocity at that side than it does at the other, as the rapids above the precipice are strongest there. It is from the center of the Horse-shoe Fall that arises that prodigious cloud of mist which may be seen so far off. The extent of the Horse-shoe Fall can only be ascertained by the eye; the general opinion of those who have most frequently viewed it is, that it is not less than six hundred yards in circumference. The island which separates it from the next fall is supposed to be about three hundred and fifty yards wide; the second fall is about five yards wide; the next island about thirty yards; and the third, commonly called the Fort Schloper Fall, from being situated towards the side of the river on which that fort stands, is judged to admeasure at least as much as the large island. The whole extent of the precipice, therefore, including the islands, is, according to this computation, thirteen hundred and thirty-five yards. This is certainly not an exaggerated statement. Some have supposed, that the line of the falls altogether exceeds an English mile. The quantity of water carried down the falls is prodigious. It will be found to amount to 670,255 tons per minute, though calculated simply from the following data, which ought to be correct, as coming from an experienced commander of one of the King's ships on Lake Erie, well acquainted in every respect with that body of water, viz. that where Lake Erie, towards its eastern extremity, is two miles and a half wide, the water is six feet deep, and the current runs at the rate of two knots in an hour; but Niagara River, between this part of Lake Erie and the falls, receives the waters of several large creeks, the quantity carried down the falls must therefore be greater than the foregoing computation makes it to be; if we say that six hundred and

1796
Weld

1796 Weld

seventy-two thousand tons of water are precipitated down the falls every minute, the quantity will not probably be much overrated.

To return now to the Table Rock, situated on the British side of the river, and on the verge of the Horse-shoe Fall. Here the spectator has an unobstructed view of the tremendous rapids above the falls, and of the circumjacent shores, covered with thick woods; of the Horse-shoe Fall, some yards below him; of the Fort Schloper Fall, at a distance to the left; and of the frightful gulph beneath, into which, if he has but courage to approach to the exposed edge of the rock, he may look down perpendicularly. The astonishment excited in the mind of the spectator by the vastness of the different objects which he contemplates from hence is great indeed, and few persons, on coming here for the first time, can for some minutes collect themselves sufficiently to be able to form any tolerable conception of the stupendous scene before them. It is impossible for the eye to embrace the whole of it at once; it must gradually make itself acquainted, in the first place, with the component parts of the scene, each one of which is in itself an object of wonder; and such a length of time does this operation require, that many of those who have had an opportunity of contemplating the scene at their leisure, for years together, have thought that every time they have beheld it, each part has appeared more wonderful and more sublime, and that it has only been at the time of their last visit that they have been able to discover all the grandeur of the cataract.

Having spent a considerable time on the Table Rock, we returned to the fields the same way by which we had descended, pursuant to the direction of the officer of engineers accompanying us, who was intimately acquainted with every part of the cataract, and of the adjoining ground, and was, perhaps, the best guide that could be procured in the whole country. It would be possible to pursue your way along the edge of the cliff, from the Table Rock, a considerable way downwards; but the bushes

are so exceedingly thick, and the ground so rugged, that the task would be arduous in the extreme. 1796 Weld

The next spot from which we surveyed the falls, was from the part of the cliff nearly opposite to that end of the Fort Schloper Fall, which lies next to the island. You stand here on the edge of the cliff, behind some bushes, the tops of which have been cut down in order to open the view. From hence you have a better prospect of the whole cataract, and are enabled to form a more correct idea of the position of the precipice, than from any one other place. The prospect from hence is more beautiful, but I think less grand than from any other spot. The officer who so politely directed our movements on this occasion was so struck with the view from this spot, that he once had a wooden house constructed, and drawn down here by oxen, in which he lived until he had finished several different drawings of the cataract: one of these we were gratified with the sight of, which exhibited a view of the cataract in the depth of winter, when in a most curious and wonderful state. The ice at this season of the year accumulates at the bottom of the cataract in immense mounds, and hugh icicles, like the pillars of a massy building, hang pendent in many places from the top of the precipice, reaching nearly to the bottom.

Having left this place, we returned once more through the woods bordering upon the precipice to the open fields, and then directed our course by a circuitous path, about one mile in length, to a part of the cliff where it is possible to descend to the bottom of the cataract. The river, for many miles below the precipice, is bounded on each side by steep, and in most parts perpendicular, cliffs, formed of earth and rocks, and it is impossible to descend to the bottom of them, except at two places, where large masses of earth and rocks have crumbled down, and ladders have been placed from one break to another, for the accommodation of passengers. The first of these places which you come to in walking along the river, from the Horse-shoe Fall downwards, is called the "Indian Ladder," the ladders having been con-

1796
Weld

structed there by the Indians. These ladders, as they are called, of which there are several, one below the other, consist simply of long pine trees, with notches cut in their sides, for the passenger to rest his feet on. The trees, even when first placed there, would vibrate as you stepped upon them, owing to their being so long and slender; age has rendered them still less firm, and they now certainly cannot be deemed safe, though many persons are still in the habit of descending by their means. We did not attempt to get to the bottom of the cliff by this route, but proceeded to the other place, which is lower down the river, called Mrs. Simcoe's Ladder, the ladders having been originally placed there for the accommodation of the lady of the late governor. This route is much more frequented than the other; the ladders, properly so called, are strong, and firmly placed, and none of them, owing to the frequent breaks in the cliff, are required to be of such a great length but what even a lady might pass up or down them without fear of danger. To descend over the rugged rocks, however, the whole way down to the bottom of the cliff, is certainly no trifling undertaking, and few ladies, I believe, could be found of sufficient strength of body to encounter the fatigue of such an expedition.

On arriving at the bottom of the cliff, you find yourself in the midst of huge piles of misshapen rocks, with great masses of earth and rocks projecting from the side of the cliff, and overgrown with pines and cedars hanging over your head, apparently ready to crumble down and crush you to atoms. Many of the large trees grow with their heads downwards, being suspended by their roots, which had taken such a firm hold in the ground at the top of the cliff, that when part of it gave way the trees did not fall altogether. The river before you here is somewhat more than a quarter of a mile wide; and on the opposite side of it, a little to the right, the Fort Schloper Fall is seen to great advantage; what you see of the Horse-shoe Fall also appears in a very favourable point of view; the projecting cliff conceals nearly one half of it. The Fort Schloper Fall is skirted at

bottom by milk white foam, which ascends in thick volumes from the rocks; but it is not seen to rise above the fall like a cloud of smoke, as is the case at the Horse-shoe Fall; nevertheless the spray is so considerable, that it descends on the opposite side of the river, at the foot of Simcoe's Ladder, like rain. 1796 Weld

Having reached the margin of the river, we proceeded towards the Great Fall, along the strand, which for a considerable part of the way thither consists of horizontal beds of limestone rock, covered with gravel, except, indeed, where great piles of stones have fallen from the sides of the cliff. These horizontal beds of rock, in some places, extend very far into the river, forming points which break the force of the current, and occasion strong eddies along particular parts of the shore. Here great numbers of the bodies of fishes, squirrels, foxes, and various other animals, that, unable to stem the current of the river above the falls, have been carried down them, and consequently killed, are washed up. The shore is likewise found strewed with trees, and large pieces of timber, that have been swept away from the saw mills above the falls, and carried down the precipice. The timber is generally terribly shattered, and the carcases of all the large animals, particularly of the large fishes, are found very much bruised. A dreadful stench arises from the quantity of putrid matter lying on the shore, and the numberless birds of prey, attracted by it, are always seen hovering about the place.

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From the foot of Simcoe's Ladder you may walk along the strand for some distance without inconvenience; but as you approach the Horse-shoe Fall, the way becomes more and more rugged. In some places, where the cliff has crumbled down, huge mounds of earth, rocks, and trees, reaching to the water's edge, oppose your course; it seems impossible to pass them; and, indeed, without a guide, a stranger would never find his way to the opposite side; for to get there it is necessary to mount nearly to the top, and then to crawl on your hands and knees through long dark holes, where passages are left open between the torn

1796
Weld

up rocks and trees. After passing these mounds, you have to climb from rock to rock close under the cliff, for there is but little space here between the cliff and the river, and these rocks are so slippery, owing to the continual moisture from the spray, which descends very heavily, that without the utmost precaution it is scarcely possible to escape a fall. At the distance of a quarter of a mile from the Great Fall we were as wet, owing to the spray, as if each of us had been thrown into the river.

There is nothing whatsoever to prevent you from passing to the very foot of the Great Fall; and you might even proceed behind the prodigious sheet of water that comes pouring down from the top of the precipice, for the water falls from the edge of a projecting rock; and, moreover, caverns of a very considerable size have been hollowed out of the rocks at the bottom of the precipice, owing to the violent ebullition of the water, which extend some way underneath the bed of the upper part of the river. I advanced within about six yards of the edge of the sheet of water, just far enough to peep into the caverns behind it; but here my breath was nearly taken away by the violent whirlwind that always rages at the bottom of the cataract, occasioned by the concussion of such a vast body of water against the rocks. I confess I had no inclination at the time to go farther; nor, indeed, did any of us afterwards attempt to explore the dreary confines of these caverns, where death seemed to await him that should be daring enough to enter their threatening jaws. No words can convey an adequate idea of the awful grandeur of the scene at this place. Your senses are appalled by the sight of the immense body of water that comes pouring down so closely to you from the top of the stupendous precipice, and by the thundering sound of the billows dashing against the rocky sides of the caverns below; you tremble with reverential fear, when you consider that a blast of the whirlwind might sweep you from off the slippery rocks on which you stand, and precipitate you into the dreadful gulph beneath, from whence all the power of man could not extricate you; you feel what an insignificant being

you are in the creation, and your mind is forcibly impressed with an awful idea of the power of that mighty Being who commanded the waters to flow. 1796 Weld

Since the Falls of Niagara were first discovered they have receded very considerably, owing to the disrupture of the rocks which form the precipice. The rocks at bottom are first loosened by the constant action of the water upon them; they are afterwards carried away, and those at top being thus undermined, are soon broken by the weight of the water rushing over them: even within the memory of many of the present inhabitants of the country, the falls have receded several yards. The commodore of the King's vessels on Lake Erie, who had been employed on that lake for upwards of thirty years, informed me, that when he first came into the country it was a common practice for young men to go to the island in the middle of the falls; that after dining there, they used frequently to dare each other to walk into the river towards certain large rocks in the midst of the rapids, not far from the edge of the falls; and sometimes to proceed through the water, even beyond these rocks. No such rocks are to be seen at present; and were a man to advance two yards into the river from the island, he would be inevitably swept away by the torrent. It has been conjectured, as I before mentioned, that the Falls of Niagara were originally situated at Queenstown; and indeed the more pains you take to examine the course of the river from the present falls downward, the more reason is there to imagine that such a conjecture is well founded. From the precipice nearly down to Queenstown, the bed of the river is strewed with large rocks, and the banks are broken and rugged; circumstances which plainly denote that some great disruption has taken place along this part of the river; and we need be at no loss to account for it, as there are evident marks of the action of water upon the sides of the banks, and considerably above their present bases. Now the river has never been known to rise near these marks during the greatest floods; it is plain, therefore, that its bed must have been once much more elevated than

1796
Weld

it is at present. Below Queenstown, however, there are no traces on the banks to lead us to imagine that the level of the water was ever much higher there than it is now. The sudden increase of the depth of the river just below the hills at Queenstown, and its sudden expansion there at the same time, seem to indicate that the waters must for a great length of time have fallen from the top of the hills, and thus have formed that extensive deep basin below the village. In the river, a mile or two above Queenstown, there is a tremendous whirlpool, owing to a deep hole in the bed; this hole was probably also formed by the waters falling for a great length of time on the same spot, in consequence of the rocks which composed the then precipice having remained firmer than those at any other place did. Tradition tells us, that the great fall, instead of having been in the form of a horse shoe, once projected in the middle. For a century past, however, it has remained nearly in the present form; and as the ebullition of the water at the bottom of the cataract is so much greater at the center of this fall than in any other part, and as the water consequently acts with more force there in undermining the precipice than at any other part, it is not unlikely that it may remain nearly in the same form for ages to come.

At the bottom of the Horse-shoe Fall is found a kind of white concrete substance, by the people of the country, called spray. Some persons have supposed that it is formed from the earthy particles of the water, which descending, owing to their great specific gravity, quicker than the other particles, adhere to the rocks, and are there formed into a mass. This concrete substance has precisely the appearance of petrified froth; and it is remarkable, that it is found adhering to those rocks against which the greatest quantities of the froth, that floats upon the water, is washed by the eddies.

We did not think of ascending the cliff till the evening was far advanced, and had it been possible to have found our way up in the dark, I verily believe we should have remained at the bottom of it until midnight. Just as we left the foot of the great

fall the sun broke through the clouds, and one of the most beautiful and perfect rainbows that ever I beheld was exhibited in the spray that arose from the fall. It is only at evening and morning that the rainbow is seen in perfection; for the banks of the river, and the steep precipice, shade the sun from the spray at the bottom of the fall in the middle of the day. 1796 Weld

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The Falls of Niagara are much less difficult of access now than they were some years ago. Charlevoix, who visited them in the year 1720, tells us, that they were only to be viewed from one spot; and that from thence the spectator had only a side prospect of them. Had he been able to have descended to the bottom, he would have had ocular demonstration of the existence of caverns underneath the precipice, which he supposed to be the case from the hollow sound of the falling of the waters; from the number of carcases washed up there on different parts of the strand, and would also have been convinced of the truth of a circumstance which he totally disbelieved, namely, that fish were oftentimes unable to stem the rapid current above the falls, and were consequently carried down the pecipice.

The most favourable season for visiting the falls is about the middle of September, the time when we saw them; for then the woods are seen in all their glory, beautifully variegated with the rich tints of autumn; and the spectator is not then annoyed with vermin. In the summer season you meet with rattlesnakes at every step, and musquitoes swarm so thickly in the air, that to use a common phrase of the country, "you might cut them with a knife." The cold nights in the beginning of September effectually banish these noxious animals.

HOLLEY, JOHN MILTON. (Whittlesey, Charles. Early history of Cleveland, Ohio. Cleveland: Fairbanks, Benedict. 1867. P. 175.) 1796 Holley

A brief notice by one of the surveyors of the Connecticut Land Company who passed the Falls in June, 1796.

1796
Holley

Sunday, 19th June (1796).— Left Buffalo in Winney's boat, for Chippewa, had a fair wind down, and arrived about one o'clock at Chippewa, dined at Fanning's, found our goods were not at the Gore, in Chippewa, and was obliged to go to Queenstown after them, and as I could not get a horse was obliged to walk. I got to Queenstown before night and lodged at Col. Ingersoll's, next morning set out for Buffalo. On the way I stopped to take a view of Niagara Falls. That river, a little above Fort Slusher, is two and one half miles wide. Soon after this the water is very rapid, and continuing on, is hurried with amazing impetuosity down the most stupendous precipice perhaps in nature. There is a fog continually arising, occasioned by the tumbling of the water, which, in a clear morning, is seen from lake Erie, at the distance of thirty or forty miles, as is the noise also heard.

1796
Liancourt

LIANCOURT, LA ROCHEFOUCAULT, *duke de.* Travels through the United States of North America, the country of the Iroquois, and Upper Canada, in the years 1795, 1796, and 1797; with an authentic account of Lower Canada. Lond.: Phillips. 1799. Vol. 1, pp. 217–223.

Liancourt wrote well and his elaborate and valuable description was widely quoted. It was probably one of the best known of the eighteenth century accounts.[1]

We were now approaching the prospect of the Grand Cataract of Niagara, one of the principal objects of our journey, and which I had long desired to see. We formed, every one of us, different ideas of this waterfall, according to our different powers of fancy; each stroke of the oars brought us nearer to it, and our attention being entirely turned to discover the foam, and hear the noise, we took but little notice of the banks of the river, which, on the side of Canada, are tolerably settled, of the uncommon width of its channel, or the majestic course of its stream. At last we heard the noise, and perceived the spray. The weather was rather unfavourable, so that we could not, at any

[1] See the chapter on *Industrial Niagara* for further quotation.

considerable distance, enjoy this grand spectacle. The rapidity of the stream, which is perceptible several miles from the falls, soon carried us to Chippaway. A whole mile before you reach that place, you must keep close under the shore, without which precaution the stream would soon involve the boat, and irresistibly hurl it to destruction. You must even make the utmost exertion in rowing to remount the Chippaway Creek, from which the fort takes its name. 1796 Liancourt

We had no sooner landed, than, with the utmost impatience, we hastened to the falls. . . . The distance of Chippaway from the falls, in a straight line, is but a mile and a half; but the banks of the river form so many flexures, that the road, which winds along them, is three miles long.

At Chippaway the grand spectacle begins. The river, which has been constantly expanding from Fort Erie to this place, is here upwards of three miles wide; but on a sudden it is narrowed, and the rapidity of the stream redoubled by the declivity of the ground on which it flows, as well as the sudden contraction of its bed. The channel is rocky; and the interspersed fragments of rocks encrease the violence of the stream. The country is flat and even to this point; but here a range of white rocks arises on each side of the river, which is contracted to half a mile's breadth. This range is a branch of the Alleghany mountains. . . . The river, more closely hemmed in by the rocks on the right, incroaching upon its channel, branches into two arms, one of which flows along the bank, formed by the rocks on the right; and the other, far more considerable, being separated by a small island, makes straight on to the left, and sweeps through a bason of stone, which it fills with much foam and noise. At length, being again obstructed by other rocks, which it meets on its right, it alters its course with redoubled violence, and along with the right arm rushes down a perpendicular ledge of rocks one hundred and sixty feet high, nearly half concave, and probably worn out by the incessant impetuosity of the waters. Its width is nearly equal to that of its bed, the uniformity of which is only

1796
Liancourt

interrupted by an island, which separates the two arms, rests unshaken on its rocky basis, and seems, as it were, to swim between the two streams, which rush down at once into this stupendous chasm. The waters of the lakes Erie, Michigan, St. Clair, Huron, and Lake Superiour, and of the numerous rivers, emptying themselves into these lakes, incessantly replace the water that thus dashes down. The water of the falls tumbles perpendicularly on the rocks. Its colour is, at times, a dark green, at others a foaming white, brilliant throughout, and displaying a thousand variegations, as it is struck by the rays of the sun, or, according to the time of the day, the state of the atmosphere, the force of the wind, &c. The water, which rushes down the rocks, rises in part in a thick column of mist, often towering above the height of the falls, and mixing with the clouds. The remainder, broken in its perpendicular descent by fragments of rocks, is in continual agitation; spouts and foams, and casts on shore logs of wood, whole trees, boats, and wrecks, which the stream has swept along in its course. The bed of the river, formed by the two ridges of rocks which extend a great way farther, is still more narrowed, as if part of this mighty stream had vanished during the fall, or were swallowed up by the earth. The noise, agitation, irregularity, and rapid descent of the stream, continue seven or eight miles farther on, and the river does not become sufficiently placid for a safe passage till it reaches Queenstown, nine miles from the falls.

I crept down to the cataract; the descent is very difficult; perpendicular steps, hewn out of trees, caverns, and projecting rocks, the scattered fragments of which warn the traveller of the danger from the descent, without offering any hold, except some decayed bushes, which the imprudent adventurer, who should place any dependence on them, would carry with him into the unfathomed abyss. Everything seems calculated to strike with terror; but curiosity is as heedless as any other passion. The certain prospect of a splendid fortune would hardly induce me to attempt, what I at this moment did from the mere impulse of curiosity.

I frequently crawled along on both hands; the zeal with which I pursued my object gave me a dextrous activity, which I was not conscious of possessing. I several times abandoned myself entirely to chance, and thus I toiled a mile and half to reach the foot of this stupendous cataract. . . . 1796 Liancourt

Near this spot is a whirlpool, the spray of which drenches your clothes even at a distance. The columns of foam, arising from the falls, mix again with the descending stream. The bason itself is hidden by this thick cloud, and the tremendous noise, which is more violent here than any where else, is the only enjoyment to be attained. You may proceed a few paces on pieces of rock, lying between the column of water and the rocks from which it rushes down; but here you are completely sequestered from the world, you are even deprived of the prospect of the falls by the column of water, which, by its density and motion, intercepts the free access of air to such a degree, that suffocation must unavoidably be the result of a long continuance in this place.

It is impossible to describe the impression, which this cataract made upon our minds. Fancy, which had long cherished the hope of viewing it, now offered pictures, which might seem exaggerated, yet were much inferior to the reality. To attempt a description of the impression we felt, would be equivalent to a description of the falls; an attempt far exceeding our powers. The enthusiasm, which seized my soul at the aspect of this magnificent spectacle, was too powerful to be weakened by our unpleasant journey back to the Fort; and it was not until I arrived at Captain Hamilton's, that I found leisure to notice my weariness, my hunger, my bruises, the miserable condition of my clothes, and the time of the day.— It was two o'clock.

. . . . .

Monday, the 22d of June.

We left Chippaway early in the morning, with an intention of once more visiting the falls. The rain, which fell in torrents, could not deter us from our design. I saw it now from a spot,

1796
Liancourt

from which Mr. de Blacons had viewed it the preceding evening, and to which he desired to conduct us. This place is known in the country by the name of Table-Rock, and forms a part of the rock over which the river precipitates itself. You here stand in the midst of its bed, and almost in the water, so that you can, with perfect safety, see the river rushing down at your feet; but, advancing only two paces, you would be hurried to destruction. On this spot you also enjoy the beautiful prospect of the foaming water dashing along over the rapids of the awful fall, from which you are not separated by any intervening object, and of the tremendous whirlpool, which engulfs it. It is *from this spot*, that this wonder of nature should be viewed, if you would see it but *from one spot*. But it ought to be contemplated from all sides; your astonishment will constantly rise, and you will behold and admire in awful silence.

The descent is more easy to the Table-rock than to any other spot. It is much to be regretted, that the government of a people, which surpasses all other nations for fondness in travelling and curiosity, should not have provided convenient places for observing this celebrated phenomenon, at all possible points of view. It is pleaded in excuse, that the number of travellers, whom curiosity leads to this spot, is inconsiderable; that even they, who travel this way on account of business, and stop here to view the falls, are few in number; that only hunting Indians and idle children form the idea of creeping down to the falls; and that consequently nobody would be benefited by the money expended in providing an easy access. Yet all these pleas cannot justify a saving of thirty dollars, for which expense the greatest curiosity in the known world would be rendered accessible.

It is superfluous to mention, that, notwithstanding the severity of the winter in this country, the *cataract*, as well as the river above it, are never frozen. But this is not the case with the lakes, and smaller rivers, which supply it with water. Enormous flakes of ice rush constantly down this cataract, when the thaw sets in, without being entirely dashed to pieces on the rocks; and thus

are frequently piled in huge masses, up to half its height. With the noise, occasioned by the falls, we were less struck than we expected; and Mr. Guillemard, as well as myself, who had both seen the Rhine-fall near Schafhausen, could not but acknowledge, that the noise it produces is far more striking. Yet, I must repeat it again and again, that nothing can stand the test of comparison with the Falls of Niagara. Let no one expect to find here something pleasing, wildly beautiful or romantic; all is wonderfully grand, awful, sublime; every power of the soul is arrested; the impression strikes deeper, the longer you contemplate, and you feel more strongly the impossibility of any expressions doing justice to your perceptions and feelings. 1796 Liancourt

1797

(Cass, Lewis.) France, its king, court and government. By an American. N. Y.: Wiley and Putman. 1840. Pp. 127-130. 1797 Cass

Duc de Montpensier, in a letter of August 14, 1797, to his sister, the Princess Adelaide of Orleans, speaks briefly of a visit to Niagara Falls.

1798

McKinnon, Daniel. A tour through the British West Indies in the years 1802 and 1803, giving a particular account of the Bahama Islands. 2d ed. with an app. Lond.: for J. White by S. Woolmer. 1812. Pp. 282–286. 1798 McKinnon

Appendix "giving an account of a tour through the state of New York and the Province of Upper Canada, and relating to the Falls of Niagara."

This appendix "originally published in some periodical works, and was addressed in a letter, dated October, 1798, to the late Major General Mackinnon."

1800

Maude, John. Visit to the Falls of Niagara, in 1800. Lond.; Longman, Rees, Orme, Brown, and Green. 1826. Pp. 131–159. 1800 Maude

By Maude's own account his book "is a faithful copy of a gentleman's journal, written to assist his memory, respecting the events of one of the most interesting of the numerous expeditions he made through various parts of the United States of America, during a residence of seven years in that country, at intervals from 1793 to 1803."

1800
Maude

In his journal he "confined himself to memoranda penciled on the spot and written down on the evening of each day." The result is a charmingly intimate narrative which reveals well the quick sympathies and keen appreciation of the author.

5 A. M. FRIDAY, AUGUST 22d.

I pursued the course of the River by a very excellent road.

This River possesses features, which, though frequently seen in Tide-water Bays, Inlets and on the Sea-Coast, yet rarely characterizes a running stream. Instead of the banks partaking of a straight or easy flowing line, they are a continuation of long points of Land making into the River, and as the Road follows the same line, the present travelled distance between Fort Erie and Chippawa might be lessened one half.

The Niagara is certainly a very noble Stream, but its banks are tame and void of all interest. The United States Shore was hid by La Grande Isle, covered with wood and unsettled.

On the Canada side, the whole distance to the Falls, with little exception, is settled; and that principally by emigrants from the United States since 1792. I only passed two boarded Houses, and those little larger than log-huts. I observed King-fishers, Pigeon-Hawks, Moths and Grasshoppers, but no Mosquitoes, and few Flies. During my approach to Chippawa, I had, for many miles, observed a heavy smoke arise on the Canada side of the Niagara, which I attributed to the burning of logs on a piece of Land then clearing; but when within two miles of Chippawa, I evidently perceived that what I considered as smoke, arose from the River, and it then occurred to me that it was the Spray of the Falls. I stopped my Horse and could distinguish the roaring of the Waters, which I had not previously been enabled to do from its gradual introduction upon my ear, the noise of my Horse's feet, and the absorption, as it were, of all my other senses in that of vision.

8½ A. M. . . . Having breakfasted, I set out on foot for the Falls; the distance is three miles by the Road, but not

more than two by the line of the River. I followed the Banks of the River, having the spray in sight. 1800 Maude

At first I found that I could keep pace with some drift Wood, but which, on reaching the first small breaker, or rapid, began to be carried on faster than a Horse could trot. As I approached the Falls, the Banks of the River became higher and higher, owing to the declivity of its bed, for the ground preserves the same level both above and below the falls. At the beginning of the great Rapids the River-bank is at least one hundred feet high.

These Rapids are highly beautiful. There are those who admire them as much as the Falls themselves. They certainly would alone make a fine picture; they extend upwards from the edge of the Fall about eight hundred yards, and have a declivity in this distance of about seventy feet, which declivity is very perceptible to the eye. The bed of the river is here very shallow, and thickly strewed with rocks, but which do not appear above the surface, except those along the north-west edge of Goat Island. Those who have seen heavy and dangerous breakers on a rocky sea-coast, may form a good idea of these Rapids.

From the high bank on which I now stood, I beheld at my feet a plot of cultivated ground, mills and houses — the Rapids — a mill-race formed in the Rapids — an island dividing them, and beyond, Goat Island, dividing the River and the Falls. Descending by a very steep and difficult road, I came to a deserted distillery, where I stopped to recover breath, and to allay my thirst at an excellent spring. I next penetrated a close thicket, interrupted almost at every step by small streams of water; the roaring of the cataract I took for my guide: emerging from the tangled thicket, I found myself upon the Table Rock, and the Niagara River dashing over it at my feet! . . . To gain a more favourable station, I crept upon my hands and knees to a projection of the rock, which, by a sudden curve at this place, was directly opposite to a huge column of falling water, if water it could now be called;— for the velocity of the current, the resistance of massy rocks in the Rapids, and the present

1800 Maude

resistance and admixture of another element, had lashed it into foam, white as the driften snow, and so compact as to resemble a falling body of pure vegetable cotton. . . . I had crept upon a projecting slab of the rock, not more, I believe, than four feet, perhaps less, in thickness, and overhanging the base of the rock which supported it full fifty feet! This slab has probably since fallen, as these rocks are constantly caving in, and the cataract receding.

SATURDAY, AUGUST 23d.

At 10 A. M. I embarked with Mr. Steadman in a bateau for Fort Schlusser. For fear of the current we poled up along shore for half a mile, till we came nearly opposite to the Western extremity of Navy Island, when we took a slant across the River, being about two miles and a half above the Falls. The River is here two miles wide, and was crossed in twenty-five minutes with three oars.

. . . . .

On landing, Mr. Steadman took us to the Old Mansion, and gave the following account of the manner in which this property came into the possession of his family: —

The Portage, or Carrying-place, which is now from Queenstown to Chippawa, was, previous to 1792, from a place opposite to Queenstown, to Fort Schlusser. In 1760, John Steadman was Master. In 1763, the Indians attacked the train of waggons and its guard, consisting in soldiers and waggoners, of ninety-six persons. Of these ninety-two were killed on the spot. Three jumped down the precipice overhanging the River, and John Steadman, putting spurs to his horse, galloped to Fort Schlusser. The three who jumped down the precipice, (considered by them as certain death, but which they preferred to the tomahawk and scalping knife of the Indians,) were preserved by shrubs and brushwood breaking their fall. One was a drummer, whose drum falling into the river, took the news of this defeat to Fort Niagara.

Peace being concluded with the Indians a few months after this massacre, they, of their own free will, made a grant to

J. Steadman, of all the land which he galloped over in his flight. This tract, so granted, begins at Bloody-bridge, the scene of action, and terminates at Fort Schlusser; its extent in depth from the River is such as to make the whole amount to four thousand nine hundred and eighty-six acres. The reason they gave for this grant was, that they considered his escape as miraculous, and that this gift was an atonement to him and the Great Spirit who protected him, for their guilt in having attempted to kill him. Many of the Indians assured him, that they had deliberate and fair shots at him, and that had be been a *deer*, he could not have escaped their rifles. 1800 Maude

After the Peace of 1783, the State of New York laid claim to Mr. Steadman's property, as being within their *right* to a mile in depth along the River. Captain Williamson so far befriended him as to get an Act passed in the Lower House of the Legislature of New York, that Mr. Steadman should retain so much of his property as was improved, amounting to fifteen hundred acres; but Mr. S. has little hopes of his Bill passing the Upper House. In the mean time some lawless persons took possession of the property. Steadman, however, again repossessed himself. In consequence of these circumstances the property has been suffered to go to ruin and waste: there still remains, however, an excellent Orchard, from which its proprietor one year received a profit of five hundred dollars for the fruit, besides amply supplying his own family. This Orchard is sometimes robbed by boys, who cross the River below the Falls in a canoe. Fort Schlusser is now a ruin.

We took for our guide to the Falls a Herefordshire man, of the name of Coldrakes, who came to this country with Philip Steadman, elder brother to the John Steadman already mentioned. Quenched our thirst at an excellent Spring near the Rapids, which on this side, also are very beautiful. After passing the race of an old Saw-mill, we reached the brink of the Fall. This is certainly the most handsome and the most picturesque view of the Falls of Niagara. From this point of view the two

1800
Maude

Falls blend into one picture, the Horse-shoe Falls presenting themselves in fine perspective. I here made two sketches. Though I mention this as the best point of view for the painter, yet the best station for the spectator is undoubtedly Table Rock. If the United States side presents you a more beautiful arrangement of the scenery, it is only from the Canada side that you can behold it in its sublimity. It was my intention to go below the Falls, but Coldrakes informed us that there was no descent but by a rope; I considered this mode as too dangerous, therefore relinquished my design.

Coldrakes had frequently been upon Goat Island with Mr. Philip Steadman. The manner of reaching the Island is to cross the River two miles above, so as to reach the dead water occasioned by the Island dividing the River into two Currents. From the Island a bar stretches far up the River, which principally enables you to reach the Island, as you pole your canoe along this bar. Goat Island contains one hundred and fifty acres of good Land: Mr. Steadman once raised a remarkably fine crop of Turnips upon it. It takes its name from a venerable goat which long resided upon it; other animals had been landed at the same time with the goats, but they could not survive the first winter, when every thing on the Island is incrusted with ice from the frozen spray of the Falls.

Coldrakes is assured that much of the Island has fallen down since he first was acquainted with it.

. . . . .

I gathered a few wild plums, of the size of the damson, but of a reddish orange colour; they were well flavoured. We saw a number of very large ant-hills, on which a Bear had left the print of his paws, and other marks of his having searched them for a favourite food. Their track is very similar to that of a Hare. Bears live in the clefts of the rocks below the Falls, as do also Wolves; and I may add Rattlesnakes, which are found in great number and extraordinary size. Coldrakes assured me that he had killed one having twenty-four rattles. I never heard of

View of Niagara

Published in 1751

(Evidently based on Hennepin and on Kalm's description)

one having more than eighteen, and very few people have seen them with as many as fourteen. It is known, however, that there are few old snakes but what have lost some of the joints of the rattle by accidents; they are very brittle. . . . 1800 Maude

Captain Lawton met us at Fort Schlusser on our return. He re-crossed the River at the same time with us, but instead of poling up the shore, he pulled his canoe directly across — an act of temerity in which no one has yet dared to vie with him. Mr. Steadman remembers when no boat or canoe dared even venture so low down as Chippawa.

Wild Fowl, alighting high up the river, are sometimes, in the night, carried down the Falls: not seeing their danger, they allow the stream to carry them too far, its rapidity and descent not allowing them to take wing. Ducks and Gulls acquainted with the Falls, have been seen within one hundred yards of the pitch, but they are careful to swim with their heads down the stream, for with their breasts to the current, they cannot take wing.

Mr. Steadman assured me that the Niagara River increases in depth, and consequently that the volume of water which passes the Falls is considerably augmented. Formerly the River opposite to Chippawa was very low in the Summer months; and Mr. S. remembers having once seen the bed of the River dry from the Fort Schlusser side to the bar running from the South point of Goat Island. The channel in this part of the River is now fifteen feet in depth.— Saw a Fishing-hawk with a large fish in its claws.

SUNDAY, AUGUST 24th.

After breakfast rode to Bender's, four miles; put up my horse and followed the path to Mrs. Simcoe's Ladder, so called from having been fixed for the conveniency of the Governor of Upper Canada's Lady visiting the Falls. From Mrs. Simcoe's Ladder to the foot of the Falls, is one mile, which I was one hour in traversing, owing to the masses of rock I had to scramble over. My first attempt was to get under the arch of the Fall. . . .

1800
Maude

Vain, however, was my every effort to get under the arch of the Cataract: having heard of the success of others, I did not easily relinquish the attempt. . . . Success here appeared to me physically impossible; the air rushed from under the arch with so much violence, that I with difficulty kept my feet; and so loaded was it with spray and vapour, that it was with much more difficulty I drew my breath. . . .

I met with a dead Snake near the Falls, and in scrambling over the rocks, started a Racoon. On my return I met four frolicsome girls, and two men and four boys fishing; so that it appears that the Sunday, even in this remote part of the world, if not kept as a *holy* day, is at least considered as a holiday. One of the men stood like Patience on a Rock, poising a spear, and *expecting* a Sturgeon;— the boys, with far humbler views, were content *to catch* Pickerel and Cat-fish. Salmon come up to the foot of the Falls.

. . . . . .

I gathered a specimen of the Black or Under Rock, another of the Superficial or Upper Rock, also, some Spar, and a substance very soft, and as white as snow, which, rather than be at a loss for a name, the fisherman told me was *congealed spray!* I now attempted to explore the shore below Mrs. Simcoe's Ladder, but after scrambling over a few rocks, I found the River ran close in with the Cliffs, and consequently was obliged to return.

MONDAY, AUGUST 25th. . . . the greater my *intimacy* with the Falls, the more they won upon my *affections.*

I was now going to take leave, and perhaps for ever, of an object, to attain a sight of which, had been a principal design of mine for many years;— an object that for these last four days had been "my ever new delight!"— an object that J. O. ——, Esq. a gentleman of the Law in New York, was this Summer induced to visit, who, to have a better view of the Falls, would not deign to dismount, but at first sight, exclaimed, "*Is that all?*" and rode on!— So true is that trite saying, "Many men — many minds!"

SUMMARY OF THE ENGLISH PERIOD

A conspicuous feature in this chapter is the absence of priestly accounts. The descriptions quoted are those of interested and curious travelers or of literary men. There is a notable increase in the number and length of the accounts given, especially towards the end of the century. And yet we have not mentioned or quoted from all the sources available. The chapter has been more or less strictly limited to popular descriptions and first-hand accounts. Other aspects of the subject properly falling within the dates of this chapter are treated under other headings.

Generally speaking, there is a noticeable improvement in the character of the accounts. The descriptions given are far less fantastic than some of the earlier ones. As might be expected, not only has much new information been added but far greater accuracy prevails. In a word, the "true Niagara" is slowly but surely being revealed. There is, however, not nearly so much new information as there might be. There is, in fact, much plagiarism. It would seem that in some cases whole accounts were borrowed and presented to the public with but slight modification. Witness the account cited under date of 1764. It would appear, from such cases as this, that Niagara information was regarded as common property.

It is interesting to notice that just as our first period was predominently French so this, our second period, is, broadly speaking, English. True, some famous French names appear, such as Chateaubriand and Liancourt. The majority of the accounts, however, are from English or American writers. Of the descriptions of this period those of Kalm, Liancourt, and Weld, not to mention any others, were especially well known.

Chapter III

CHAPTER III

TRAVELERS' ORIGINAL ACCOUNTS: 1801–1840

1801

HERIOT, GEORGE. Travels through the Canadas, containing a description of the picturesque scenery on some of the rivers and lakes; with an account of the productions, commerce, and inhabitants of those provinces. . . . Lond.: Richard Phillips. 1807. Pp. 159–173. 1801 Heriot

Along the boundaries of the river, and behind the falls, the elevated and rocky banks are every where excavated by sulphureous springs, the vitriolic acid uniting with the limestone rock, and forming plaster of Paris, which is here and there scattered amid the masses of stone which compose the beach beneath.

These excavations extend in many places to a distance of fifty feet underneath the summit of the bank.

Casting the eye from the Table Rock into the basin beneath, the effect is awfully grand, magnificent, and sublime. No object intervening between the spectator and that profound abyss, he appears suspended in the atmosphere.

The lofty banks and immense woods which environ this stupendous scene, the irresistible force, the rapidity of motion displayed by the rolling clouds of foam, the uncommon brilliancy and variety of colours and shades, the ceaseless intumescence, and swift agitation of the dashing waves below, the solemn and tremendous noise, with the volumes of vapour darting upwards into the air, which the simultaneous report and smoke of a thousand cannon could scarcely equal, irresistibly tend to impress the imagination with such a train of sublime sensations, as few other combinations of natural objects are capable

1801 Heriot

of producing, and which terror lest the treacherous rock crumble beneath the feet by no means contributes to diminish.

. . . . .

From a settlement called Birch's Mills, on level ground below the bank, the rapids are displayed to great advantage; they dash from one rocky declivity to another, and hasten with foaming fury to the precipice. The bank along whose summit the carriage-road extends, affords many rich, although partial views of the falls and rapids. They are from hence partly excluded from the eye by trees of different kinds, such as the oak, the ash, the beech, fir, sassafras, cedar, walnut, and tulip-trees.

About two miles further down the side of the river, at a situation called Bender's, an extensive and general prospect of the falls, with the rapids and islands, is at once developed to the eye of the spectator. On descending the bank which in several places is precipitous and difficult, and on emerging from the woods at its base, a wonderful display of grand and stupendous objects is at once expanded to the view. From amid immense fragments of rock, and lacerated trees which have descended in the current of the waters, the eye is directed upwards toward the falls, that of Fort Slausser being on the left, and the Great Horse-shoe fall immediately in front. On the right is a lofty bank profusely covered with diversity of foliage, beyond which the naked, excavated rock discloses itself.

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The Horse-shoe fall is distinguished not only by its vastness, but by the variety of its colours. The waters at the edge of the Table Rock are of a brownish cast, further on of a brilliant white, and in the center, where the fluid body is greatest, a transparent green appears. Around the projection, which is in the form of a horse-shoe, the water is of a snowy whiteness. A cloud of thick vapour constantly arises from the center, part of which becomes dissolved in the higher regions of the atmosphere, and a part spreads itself in dews over the neighbouring

fields. This cloud of vapour has frequently, in clear weather, been observed from Lake Ontario, at the distance of ninety miles from the falls. 1801 Heriot

The bed of the river is so deep, that it undergoes not such a degree of agitation as the reception of those bodies of water perpetually pouring down into it might be supposed to produce. Except at the places immediately underneath each of the falls, there are no broken billows; the stream is comparatively tranquil, but the water continues for a long way down its course, to revolve in numerous whirlpools. Its colour is a deep blue; quantities of foam float upon the surface and almost cover a large bay formed between projecting points, containing several insulated rocks.

Proceeding along the beach to the basis of the Table Rock, the distance is about two miles, and the way thither is over masses of stone which have been torn from the bank above, and over trees which have been carried down the falls, and have been deposited in the spring by bodies of ice, in situations above twenty feet in height from the level of the river. . . .

About half a mile from hence, in descending the course of the river, and behind some trees which grow upon the lower bank, is placed the Indian ladder, composed of a tall cedar tree, whose boughs have been lopped off to within three inches of the trunk, and whose upper end is attached by a cord of bark to the root of a living tree; the lower end is planted amid stones. It is upwards of forty feet in length, and trembles and bends under the weight of a person upon it. As this is the nearest way to the river-side, many people descend by the ladder, led either by curiosity, or for the purpose of spearing fish, which in the summer are found in great abundance in this vicinity.

The spear in use is a fork with two or three prongs, with moving barbs, and fixed to a long handle. The fisherman takes possession of a prominent rock, from whence he watches for his prey, and when it approaches within his reach, he pierces it with his instrument, with an almost inevitable certainty.

. . . . .

1801
Heriot

Can so vast, so rapid, and so continual a waste of water never drain its sources? These are inexhaustible; and the body which throws itself down these cliffs, forms the sole discharge of four immense inland seas.

The effect produced by the cold of winter on these sheets of water thus rapidly agitated, is at once singular and splendid. Icicles of great thickness and length are formed along the banks, from the springs which flow over them. The sources, impregnated with sulphur, which drain from the hollow of the rocks, are congealed into transparent blue columns. Cones are formed by the spray, particularly on the American side, which have in several places large fissures disclosing the interior, composed of clusters of icicles, similar to the pipes of an organ. Some parts of the falls are consolidated into fluted columns, and the river above is seen partially frozen. The boughs of the trees in the surrounding woods are hung with the purest icicles formed from the spray, and reflecting in every direction the rays of the sun, produce a variety of prismatic hues, and a lustre almost too refulgent to be long sustained by the powers of vision.

Part of this description was published in 1801 in the London *Sun*, and afterwards copied from that paper into the *Moniteur* at Paris. It seems to have been widely known throughout Europe.

1802

1802
Kent

KENT, WILLIAM. Memoirs and letters of James Kent, late chancellor of the state of New York. Bost.: Little, Brown and Co. 1898. Pp. 154–156.

The chancellor rode the western circuit in the summer of 1802. "Incidentally he made a trip to Niagara Falls, then but rarely visited from the Eastern States, which made a great impression on his imagination." By his own account Kent felt only astonishment, terror, and awe at the sight. "The scene," he writes, "sets all comparison, all rivalship at defiance. It is, in one word, the most awful and sublime of the wonderful works of nature."

1804

1804
Moore

MOORE, THOMAS. Memoirs, journal & correspondence of Thomas Moore; ed. by Lord John Russell. Lond.: Longman, Brown, Green and Longman's. 1853. 1:169–173.

Niagara, July 24, 1804. 1804 Moore

My dearest Mother,

I have seen the Falls, and am all rapture and amazement. . . . Never shall I forget the impression I felt at the first glimpse of them which we got as the carriage passed over the hill that overlooks them. We were not near enough to be agitated by the terrific effects of the scene; but saw through the trees this mighty flow of waters descending with calm magnificence, and received enough of its grandeur to set imagination on the wing; imagination which, even at Niagara, can outrun reality. I felt as if approaching the very residence of the Deity; the tears started into my eyes; and I remained, for moments after we had lost sight of the scene, in that delicious absorption which pious enthusiasm alone can produce. We arrived at the New Ladder and descended to the bottom. Here all its awful sublimities rushed full upon me. But the former exquisite sensation was gone. I now saw all. The string that had been touched by the first impulse, and which *fancy* would have kept for ever in vibration. now rested at *reality*. Yet, though there was no more to imagine, there was much to feel. My whole heart and soul ascended towards the Divinity in a swell of devout admiration, which I never before experienced. Oh! bring the atheist here, and he cannot return an atheist! I pity the man who can coldly sit down to write a description of these ineffable wonders; much more do I pity him who can submit them to the admeasurement of gallons and yards. It is impossible by pen or pencil to convey even a faint idea of their magnificence. Painting is lifeless; and the most burning words of poetry have all been lavished upon inferior and ordinary subjects. We must have new combinations of language to describe the Falls of Niagara.

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MUNRO, ROBERT. A description of the Genesee country in the state of New York. New York: Printed for the author. 1804. (O'Callaghan, Doc. hist. of the state of New York. 2:1177.) 1804 Munro

1805

1805 Bigelow

BIGELOW, TIMOTHY. Journal of a tour to Niagara Falls in the year 1805. Bost.: John Wilson and Son. 1876. Pp. 56–68.

The grandeur of this scene is only to be exceeded by the ocean, in some of its wildest moods; and, were there nothing else in the vicinity worthy of attention, this alone would be resorted to from great distances by the curious, as a just subject of wonder and astonishment.

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Having, according to custom, examined this wonderful phenomenon from the Table Rock, we proceeded down the river to the place where, by the help of a ladder, it is practicable to descend to the edge of the water below the fall. To comprehend this difficulty, one must know that from the foot of the fall to the village of Queenstown, seven or eight miles downstream, the river flows in a kind of canal or trench, the banks or sides of which are of solid rock, of the same elevation at first as the precipice at the fall, and this elevation gradually increases as the water sinks in its course. These banks some ways from the bottom are perpendicular, but near the top they project towards the river so much that the Table Rock itself is thought to extend near four rods beyond the sides of the rock which supports it underneath.

The ladder above mentioned is called the Simcoe Ladder, because it was provided by order of the lady of the late governor of that name. It is situated about three quarters of a mile below the Table Rock, at a place where the bank does not project so much as at most other places, and where there is a mass of the fallen rock for its foot to rest on, from whence one may make his way to the river. The passage of this ladder is by some thought to be so perilous that they forego their curiosity rather than attempt it. This actually happened with a gentleman who was there about an hour before us. The ladder is placed edgeways against the bank, a little declining from a perpendicular direction.

It is but poorly secured to some small trees at the top by pieces of old iron hoops, and the bottom rests on a rock. After you have descended a few feet, you perceive that the bank from whence you stepped on the ladder projects, and that you seem to be suspended in the air. From the foot of the ladder, the approach to the foot of the falls is rendered extremely difficult by the immense and irregular masses of rock which have fallen from the side, and a guide is necessary to conduct you. For notwithstanding that the fall for the most part is full in view, yet the path is sometimes through fissures of rock or between detached fragments of the rock, from whence a stranger would find it difficult to extricate himself; . . . The rock which constitutes the bank is disposed in strata, the upper and principal of which are of limestone, others are of slate, no freestone or granite. Many other mineral substances are to be observed in it; and streams of pure sulphur ooze from crevices of the rock in several places, and leave a yellow concretion on the wall from thence to the bottom.

1805
Bigelow

Having, while yet at a good distance, prepared ourselves to be wet, by leaving all our surplus clothing on a rock, we proceeded towards the foot of the rock. Our first attempt was to ascertain how far it was practicable, as some travellers have affected to get between the falling water and the rock behind it. We accordingly passed along close to the perpendicular side, as far as we thought it prudent, much further than it was convenient, and we believed as far, at least within a very few feet, as it is practicable to go. We might, perhaps, with propriety say that the very edge, the feather edge of the water, poured over our heads, and fell in front of us. But the spray was as profuse as rain in the most copious showers; and a storm of wind, which perpetually rushes from behind the falling column, once deprived us of breath by its violence, and of sight, by dashing the water into our eyes. We could perceive, however, behind the column it was dark, and we were moreover treading upon a shelving mass of crumbled slate, which would scarcely support us, which was

1805
Bigelow

so mixed with the water that live eels were actually moving about between our feet, and a false step, or sudden precipice which we might not be able to discern, would have plunged us where nothing could have saved us from instant destruction. From these considerations, it will readily be believed that not many adventurers have proceeded further, and none much further, than we did; and, as it could not with any propriety of speech be said that we were between the river and the rock over which it pours, by several rods, it may safely be affirmed that such a notion is altogether chimerical. Indeed, were there a firm foundation to travel on behind the water, and could one with safety be placed there, it would require a miracle to prevent his being immediately suffocated. Being satisfied, therefore, upon this point, we retired out of the reach of the tempest, to a place where we could leisurely contemplate the scene around us. When the wind is favorable for driving off the cloud which rises from the centre of the Horseshoe, much more of the cataract may be seen than at other times. The wind was not in the most favorable state while we were there. The view, nevertheless, was exceedingly grand and impressive, much more so than from the Table Rock. Above, it is true, you can see the whole descent of the water, by observing a part of the column at some distance from you: but that distance diminishes its apparent height and velocity, and below, you see with the most distinctness that part of the column which is nearest to you, and which falls almost at your feet.

Above, therefore, you can hardly persuade yourself that the fall is so great as it is, but below, the river seems literally to proceed out from the clouds. The noise also, which upon the Table Rock is a heavy roar, is so intense below that it is difficult to carry on conversation. There is in it a peculiar hurry and vehemence, and it is said by some to communicate a tremulous motion to the surrounding country. Besides the dense cloud which ascends from the bottom of the Horseshoe, there is a vapor and mist continually falling, to the distance of one hundred rods,

so that at all times when the sun shines you may here see a rainbow. Considerable quantities of lumber, which had come over the fall from the saw-mills above, were cast up among the rocks on the shore. They were rounded and smoothed on all sides, much like the under surface of a wooden sled-runner, when nearly worn out. We had been told that the carcasses of dead fish which had perished in the fall were to be found strewed along the shore. We saw none such. We met with dead and putrid fish upon the rocks in many places, but they had been caught by fishermen, and had probably been left by accident. We saw several persons angling there for the white and black bass, who appeared to be pretty successful. 1805 Bigelow

. . . . . .

. . . After passing the Falls, the river is not to be seen from the road for seven or eight miles, although it cannot be at any considerable distance. The face of the country, as the road goes, the whole length from Lake Erie to Queenstown, is remarkably level, and certainly has no perceptible descent. At the latter place, however, it falls at once, as much and more than the road by the side of the Great Falls, to the surface of the water below them. This consideration, with others before mentioned, and the appearance of the river banks just where it emerges from its confinement, leave no doubt on the mind that here was once the Cataract.

The banks exhibit several strata of rock, worn through perpendicularly by the violence of the current; and a regular glacis or gradation of descent, from ledge to ledge, to the surface of the bank in the village. The Cataract must therefore originally have been a series of cascades. The river at this place is not more than a quarter of a mile wide; an eddy sets back on each side; the current, nevertheless, is not more rapid than in many other places where it is six times as wide. Therefore, the water must here be very deep, which indeed is a necessary consequence of the force with which the torrent formerly descended from the precipice above. We understood that some attempts had been

1805 Bigelow made last winter through the ice to measure this depth, and that it was found to exceed sixty fathoms; but it was doubtful, at last, whether the bottom had been ascertained.

Quoted from the journal of a distinguished Massachusetts lawyer who set out from Boston in July, 1805, with four companions and traveled through the interior of New York state, then almost a wilderness. In the course of their travels the company came to Niagara.

1806

1806 E. Falls of Niagara. (Portfolio. May, 1811. 5:450–452.)

A brief description of Niagara at night under compact black clouds stretching across the river.

1807

1807 Richard RICHARD, JOHN. The conversion of Mr. John Richard related by himself. (U. S. Cath. hist. mag., 1887. 1:94.)

The journal of a Methodist minister of Virginia who, in 1807, made a journey to Montreal for the purpose of converting the Sulpitians there to the Protestant faith, but instead himself went over to Catholicism. He visited the Falls on July 28, 1807.

1807 Schultz SCHULTZ, CHRISTIAN. Travels on an inland voyage through the states of New-York, Pennsylvania, Virginia, Ohio, Kentucky and Tennessee, and through the territories of Indiana, Louisiana, Mississippi and New-Orleans; performed in the years 1807 and 1808; including a tour of nearly six thousand miles. 2 vol. N. Y.: Isaac Riley. 1810. 1:54, 58–83.

Schultz visited the Falls in August, 1807 and reported in graphic style what he saw and heard there.

Before the rising of the wind, as I was on deck, I could very plainly distinguish the hollow murmuring of the Falls of Niagara, although not less than twenty miles distant [Lake Ontario]. As soon as the wind began to breeze, however, the sound was lost, nor did I hear it again until I landed at this place [Fort Niagara]. The roar of these falls can be heard at any considerable distance only during a perfect calm, and when a light current of air comes from the direction of the falls; when, I am told, it has been heard at a distance of forty miles across the lake. . . .

The Falls of Niagara are certainly the greatest natural curiosity that I have ever seen. . . . 1807 Schultz

Figure to yourself the first collection of these waters, at a distance of upwards of two thousand miles, passing through the Lake of the Woods, Rainy Lake, and several smaller, and at length falling into Lake Superior, the Mediterranean of North America, being of itself upwards of sixteen hundred miles in circumference, and supplied by more than thirty considerable rivers; from thence continuing its course into Lake Huron, eight hundred miles in circumference, where, meeting the immense collection of waters flowing from the south west through Lake Michigan, still larger than Lake Huron, it continues its course through Lake St. Clair into Lake Erie, which is also nearly eight hundred miles in circuit; from thence, with a rapid current, passing down the Niagara River to the *frontier* of what may be called the upper country, with astonishing grandeur, it there discharges this immense body of water down a perpendicular precipice of nearly two hundred feet, which forms the celebrated cataract of Niagara.

. . . . .

After having satisfied ourselves with the present view of these falls, and conformed to the custom of the place, by engraving our names on a rock, we proceeded to the place leading to the bottom, for which purpose I had understood there was a convenient ladder; but, upon examination, found it so old and crazy as almost to make me give over the attempt. You will perhaps excuse my timidity, when you are informed that this ladder, which is eighty feet in length, is placed in a perpendicular direction over sharp and cragged rocks; and its being spliced and bound together in several places with grape vines, did not tend to lessen the ill opinion I had already conceived respecting its sufficiency. However, there was no choice; our guide, being accustomed to the descent, had already disappeared. I endeavoured to prevail upon Mr. L. to lead the way, but to no purpose; "he did not think it would pay for the trouble;

1807
Schultz

and, as for his part, he had seen as much as he cared for." I was at length under the necessity of descending alone, and had already gone about half the way, when I found the poor ladder, by some accident or other, had lost four of its rounds; this circumstance, added to its constant tremulous motion, did not render my situation a whit more pleasing; so making one more effort to reach the yet distant step, and finding it impossible, without sliding down the side of the ladder, and recollecting at the same moment that I could not slide *up* again, I determined to ascend, and wait until I could provide a rope to support myself with. Having at length procured one from a neighbouring house, I descended, without much difficulty, to the bottom of the ladder. The remaining height is comparatively easy; but, winding over sharp and rugged fragments of rocks, it requires some caution and a sure foot to avoid a fall, which, probably, would be attended with some serious accident.

This ladder is placed about half a mile below the falls, the whole of which distance, after descending the ladder, you have to walk over sharp pointed fragments of rocks, which occasionally break off from the projecting precipices above, particularly towards spring, when the thaws commence. Our guide pointed out to us a huge mass which had fallen since he was here last, which was very evident, as the fresh earth and leaves still adhered to the fragments in many places. In approaching the falls from these lower regions, you soon perceive the vast difference between the noise here and above; and although it may be said that you *see* the falls from above, yet it certainly is below where you *hear* them. From above you indeed hear a great roaring noise, yet it has the resemblance of being at some considerable distance; but, when once you approach from below, your ears seem gradually to lose all sense of hearing, and for some minutes you are doubtful whether you really possess that faculty or not. The first involuntary motion of the eye, after taking a hasty view of the falling sheet, and the violent agitation of the rebounding waters, as you approach the falls, is to trace the excavated and projecting point

of the Table Rock, upon which you stood above. You halt — your eye roves wildly over the scene before you — your hair becomes erect, and a sudden chill seems to pervade the whole body, when you reflect that your very existence should, even for a moment, have rested upon the slender shell of what now appears to be a *trembling* excavated rock, threatening almost instantaneous precipitation into the dreadful abyss below! 1807 Schultz

. . . . .

I advanced behind the fall, or rather behind the margin of the falling mass, when, on a sudden, I found a difficulty of respiration. The attack was slight, but unexpected. I retreated a step or two, but finally persuaded myself it was nothing more than an involuntary precaution, which my timidity had inspired. I accordingly advanced, but cautiously, to the same spot, where I halted for a moment, and found my respiration easy, which again convinced me that I was mistaken. I therefore moved slowly forward, and had, as near as I can recollect, advanced three or four steps, when I was a second time attacked so severely as nearly to deprive me of my senses. I retreated a few paces, and, lest I should become giddy, and fall into the abyss beneath, set myself down on the wet rock, where, in a few seconds, I discovered I had lost my hat, which I perceived lying about five or six paces from me. One moment's reflection, however, convinced me of the imprudence of a third attempt; I therefore retreated a few steps more in order to make my future experiments with less personal danger.

Finding myself, therefore, in a place of security, I took up a stone weighing one or two pounds and threw it with all my strength between the sheet of falling water and the rocks; it fell about forty feet from where I stood, as if it had there met something to oppose its farther progress. I repeated the experiment above a dozen times, and always found the same result. Larger stones I could cast in any other direction to a distance of eighty and one hundred feet; but immediately behind the falls, about thirty or forty feet, was the greatest distance I could cast one,

1807
Schultz

beyond the place I had advanced; from whence I conclude that the compression of air between the falls and rocks is so great that no living creature *ever has*, or *ever can* pass betwixt them. It is impossible for me to describe to you accurately how I felt when I was attacked; for, to confess the truth, I was too much frightened at the moment to form any idea not immediately connected with my own preservation. I am wholly at a loss whether or not it was in reality a difficulty of breathing which prevented my advancing. The strongest impression upon my mind is, that I felt something like a blow in my face, without, however, leaving any marks of violence; but how or in what manner I lost my hat I was not sensible, but *believe* it must have been by a sudden blast of wind. . . .

While yet at a very great distance, you will always observe a volume of clouds hovering over the falls; nor is there any exception even in the clearest and brightest day; the only perceivable difference is in their height and colour. In a clear bright day they appear very high and white, while, on the contrary, in heavy, cloudy weather, they sink lower, and acquire a smoky appearance. These clouds proceed from the vapour arising from the spray formed by the dashing of the water; while the change of colour and variation of height depend upon the change of the heavens and density of the atmosphere. The farmers settled immediately in the neighbourhood of the falls informed me that this spray causes the death of a great part of their cattle during the cold winters, as the continued fall of the dew and vapour constantly covers them with a coat of ice, which brings on a disease that carries them off in a short time.

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When you are at Fort Schlosser you have about one mile to walk to the pitch of the falls, the greater part of which distance is along the banks of the river, where you have an occasional peep at the rapids above. About a quarter of a mile before you arrive at the falls you pass an excellent set of mills, erected by Porter, Barton & Co. The situation of these mills is so very

eligible, nature having prepared every thing, that there remained little else to do but to build them. As you proceed, Goat Island, which divides the falls, is seen at no great distance on your left; the river between is full of rocks, and here and there you perceive considerable lodges of drift wood, seemingly waiting for a rise of the river in order to launch themselves over the falls. 1807 Schultz

The margin of the river on this side is much obstructed with trees and bushes, so that it requires some labour to clear away a space sufficiently large to obtain a full view of the falls. You may approach equally as near to the falling sheet on this as on the opposite side of the river; and, by taking a proper station, in the morning of a clear day, upon the edge of the precipice, you will behold beneath your feet a beautiful and variegated rainbow, stretching from the American to the Canada shore, and perpetually rolling, as if it intended to confound all its bright and glorious colours into one confused mass, while each still remains separate and distinct.

You may, likewise, have a very handsome view not only of the falls, but also of the river both above and below, by climbing sixty or seventy feet up a sturdy old oak, which stands on the margin of the precipice, a small distance below the falls, and near the banks of the river.

We next went to examine the *hole* which leads to the lower regions on this side of the river. The appearance of it was so truly frightful that I relinquished the design I had formed of descending it, and returned to my lodgings. Being assured, however, the next day, that the appearance was more dreadful than the reality, and that any person not subject to giddiness, who could depend upon the strength of his arms in sustaining the weight of his body occasionally, might descend in perfect safety, I determined to make the attempt. Procuring a guide and some ropes, I proceeded to the hole, which was not less than two hundred feet above the surface of the river. The guide, having made a rope fast to a tree, soon disappeared under the projecting rock, while he repeatedly called on me to follow. Ashamed at length

1807
Schultz

of my own timidity, I obeyed, and, after a thousand hairbreadth escapes, arrived safely at the bottom.

In making the descent on this side, I had occasion to remark, as on the other, the vast difference in the noise heard from above and below. Whether it was owing to the current of air setting over on this side, or some other cause, I know not; but certainly the thundering roar of the waters was much greater than on the other. The dread of falling while descending prevented my noticing the increased ratio of the noise; but I no sooner found myself at the bottom, than the mountains appeared to tremble over my head, and the rocks seemed to move under my feet; and, indeed, it is some time before you can free yourself from these sensations.

You may advance so near to the fall on this side as to wash your hands in the falling water; but here, as on the other side, in a few minutes you are quite wet to the skin. This is owing to the abundance of vapour which is continually falling; for, in many places, the spray rebounds from the rocks with so much violence as to prevent a nearer approach; and the constant humidity has covered the rocks below the falls with a luxuriant growth of grass of three feet in length, amongst which are found thousands of young eels.

Immediately below the falls is a small space in the river, over which a boat might cross with the greatest safety, being the only place where such a passage is practicable between the falls and Queen's Town. The cause I take to be this: the immense column of water is hurled into the unfathomable gulph to a great depth immediately *above* this spot, and, by its own reaction, breaks out with inconceivable fury *below;* it causes a kind of calm eddies over the surface of the intermediate space alluded to, which, although it appears white from the raging of the waters underneath, yet, comparatively, may be considered as still as a mill-pond. What first led me to this reflection was the manoeuvres of some wild ducks, which I observed swimming backwards and forwards across this space, and who carefully avoided every place

which I should have thought dangerous for a boat. Could I have obtained a canoe or skiff, I should not have hesitated a moment about trying the experiment. There are considerable quantities of fish, deer and other animal bones found along this shore, being, as I suppose, the remains of such as have been crushed in the falls. It is the common opinion, however, that the smaller fish generally escape unhurt. 1807 Schultz

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I am much surprised that a place so celebrated as the Falls of Niagara, and which is visited by so many travellers, amongst whom are no inconsiderable number of ladies, should not yet have induced some enterprising person to erect a convenient house on this side of the river for their accommodation, as likewise a proper stairs for descending to the bottom of the falls. Twenty-five dollars would defray the expense of a convenient stair-ladder with hand-rails; and surely no person, after travelling from two hundred to one thousand miles to view the falls, would hesitate to pay one, or even five dollars, for a safe and easy conveyance to the bottom. Judge P. who owns the lands adjoining the falls on this side of the river, informed me he should, as soon as possible, build a house near the best view of the falls, and appoint some proper person to keep a genteel tavern for the accommodation of the curious. He will likewise erect a stairs, sufficiently safe and easy for ladies to descend to the foot of the falls.

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When last on the Canada shore, I saw an old Indian who spoke tolerably good English, and had a long chat with him respecting the falls. He informed me, that, when he was a young warrior, he was amongst those who gave Braddock his famous defeat; that at that time there was a small rocky island that laid upon the very edge of the falls, at no great distance from Goat Island, and which was very remarkable for having two trees projecting over the falls. It is reasonable to believe that this account is not untrue, as eight or ten large rocks, lying very near

1807 Schultz

the edge of the falls, are still perceptible, and which, in all probability, are the last fragments of the little island he alluded to.

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We found some juniper berries on this [Goat] island, which were the largest I haye ever seen in the State of New-York. . . .

The author will not conceal that an additional motive for consenting to the publication of these letters, was the perusal of a volume lately published, entitled, "*Travels in America, by Thomas Ash, Esq.*" purporting to be a part of the same route which he has travelled. From a careful examination of this work, which is found to abound in *mistakes*, *misrepresentations* and *fictions*, in almost every page, the author does not hesitate to declare, that in his opinion the *whole* is a *compilation*, taken principally from "*The Pittsburgh Navigator;*" nor does he believe that any such person ever travelled the route pretended to be described. [Evidence cited.]—*Preface, p. iv.*

1812

1812 Giles

GILES, CHARLES. Pioneer; a narrative of the nativity, experience, travels, and ministerial labors of Rev. Charles Giles . . . with incidents, observations, and reflections. N. Y.: G. Lane and P. P. Sandford. 1844.

The author was a missionary whose reflections on the Falls were made some time after his visit there in 1812.

1812 Melish

MELISH, JOHN. Travels in the United States of America, in the years 1806 & 1807, and 1809, 1810, & 1811. . . . Phila.: T. and G. Palmer. 1812. 2:318–323.

Other editions appeared in 1815 and 1818. The work was for many years regarded as "standard and authoritative." Melish apparently did not see the Falls from the American side.

1814

1814 Smith

SMITH, MICHAEL. A geographical view of the British possessions in North America. . . . Balt.: P. Mauro. 1814. Pp. 62–74.

1816–1817

HALL, FRANCIS. Travels in Canada and the United States, in 1816 and 1817. Lond.: Longman, Hurst, Rees, Orme, & Brown. 1818. Pp. 230–238. 1816–17 Hall

Like many another visitor to the Falls this author felt that to describe the Falls was "to tell a thrice told tale," but yet could not restrain the desire to record at least some of the emotions which the spectacle inspired. He was a careful observer and his account is sensible. Especially interesting are his remarks on the increased accessibility of the Falls. He boldly accepts the recession theory regardless of the havoc which it plays with the accepted chronology.

At Queenston, seven miles from the falls, their sound, united with the rushing of the river, is distinctly heard. At the distance of about a mile, a white cloud hovering over the trees, indicates their situation: it is not, however, until the road emerges from a close country into the space of open ground immediately in their vicinity, that the white volumes of foam are seen, as if boiling up from a sulphurous gulph. Here a foot-path turns from the road, towards a wooded cliff. The rapids are beheld on the right, rushing, for the space of a mile, like a tempestuous sea. A narrow tract descends about 60 feet down the cliff, and continues across a plashy meadow, through a copse, encumbered with masses of limestone; extricated from which, I found myself on the Table Rock, at the very point where the river precipitates itself into the abyss. The rapid motion of the waters, the stunning noise, the mounting clouds, almost persuade the startled senses, that the rock itself is tottering, and on the point of rolling down into the gulph, which swallows up the mass of descending waters. I bent over it, to mark the clouds rolling white beneath me, as in an inverted sky, illumined by a most brilliant rainbow,—one of those features of softness which Nature delights to pencil amid her wildest scenes, tempering her awfulness with beauty, and making her very terrors lovely.

There is a ladder about half a mile below the Table Rock, by which I descended the cliff, to reach the foot of the fall.

1816–17
Hall

Mr. Weld had detailed the impediments, and difficulties of this approach, and M. Volney confesses they were such as to overcome his exertions to surmount them; a few years, however, have made a great change; the present dangers, and difficulties may be easily enumerated. The first is, the ordinary hazard every one runs, who goes up, or down a ladder; this is a very good one of 30 steps, or about 40 feet; from thence the path is a rough one, over the fragments, and masses of rock, which have gradually crumbled, or been forcibly riven, from the cliff, and which cover a broad declining space, from its base to the river brink. The only risk in this part of the pilgrimage, is that of a broken shin from a false step. The path grows smooth as it advances to the fall, so that the undivided attention may be given to this imposing spectacle. I felt a sensation of awe as I drew near it, like that caused by the first cannon on the morning of battle. I passed from sunshine into gloom and tempest: the spray beat down in a heavy rain; a violent wind rushed from behind the sheet of water: it was difficult to respire, and for a moment, it seemed temerity to encounter the convulsive workings of the elements, and intrude into the dark dwellings of their power: but the danger is in appearance only; it is possible to penetrate but a few steps behind the curtain, and in these few, there is no hazard; the footing is good, and the space sufficiently broad and free: there is not even a necessity for a guide, two eyes amply suffice to point out all that is to be seen, or avoided. During my first visit, there were two young American ladies on the same errand, who were drenched, as well as myself, in the cloud of spray. In my opinion, more is lost than gained, by this facility. The effect produced upon us, by any object of admiration, is increased by the difficulties of approaching it: the imagination does not suffer to be thrown away, a single particle of all that has been expended in the pursuit. . . . For Niagara, I foresee that in a few years travellers will find a finger post, "To the Falls' Tea Gardens," with cakes, and refreshments, set out on the Table Rock.

The name of "the horse shoe," hitherto given to the larger Fall, is no longer applicable: it has become an acute angle. M. Volney, and Mr. Weld have observed this change. An officer, who had been stationed in the neighbourhood thirty years, pointed out to me the alteration which had taken place in the centre of the Fall, which he estimated at about eighteen feet in the thirty years. 1816–17 Hall

1817

MONTULE, EDOUARD DE. A voyage to North America, and the West Indies in 1817. Lond.: Phillips. 1821. Pp. 92–95. 1817 Montule

Contains a letter from "Buffaloe," under date of July 31, 1817, describing a visit to an Indian village near Buffalo and to the Falls. The Frenchman viewed the Falls from Table Rock, penetrated some distance behind the Falls on the Canadian side, and made some measurements on his own account.

SANSOM, JOSEPH. Sketches of Lower Canada, historical and descriptive; with the author's recollections of the soil, and aspect; the morals, habits, and religious institutions, of that isolated country; during a tour to Quebec in the month of July, 1817. New York: Kirk and Mercein. 1817. P. 294. 1817 Sansom

1818

DUNCAN, JOHN M. Travels through part of the United States and Canada in 1818 and 1819. N. Y.: W. B. Gilley; New Haven: Howe & Spalding. 1823. 2:29–58. 1818 Duncan

The record of two visits made in the fall of 1818. There is some discussion of the recession of the Falls, a theory which the author regards as gratuitous.[1]

Niagara, October, 1918.

. . . It was on a beautiful morning that I last left Buffalo; the sky was clear and the air perfectly serene. Not a single cloud was seen upon the broad expanse, except in the northwest, on the very verge of the horizon, where two little fleecy specks appeared and disappeared at intervals; sometimes rising sepa-

[1] For further quotation, see the chapter on *Science — Geology — Physics.*

1818
Duncan

rately, and sometimes mingling their vapours. These were clouds of spray rising above the falls; perfectly conspicuous to the naked eye at a distance of twenty miles.

The western bank of the Niagara has been settled for a considerable period; the land is of excellent quality, and a great part of it cleared and cultivated. It will no doubt be a long time, ere the whole landscape assume that unpicturesque commonplace, which is produced by ploughing and harrowing, levelling and enclosing; many an axe must be raised, and many a lofty pine-tree measure its length upon the ground, ere waving grain displace all the shaggy forests which stretch around. Time however, that silent but most innovating of reformers, is working wondrous changes on this western world; and his operations are nowhere so apparent as on the banks of navigable streams. In a few years, perhaps, the noise of the cataracts may be drowned in the busy hum of men; and the smoke of clustering towns, or more crowded cities, obscure on the horizon the clouds of spray, which at present tower without a rival.

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Nearly opposite the middle of Goat Island the channel of the rapid suddenly widens, encroaching with a considerable curvature upon the bank, as if a portion of the water sought to shun by a circuitous route its inevitable destiny. In this little bay, if it may be so called, are a number of islets covered with wood, and to all appearance securely anchored amid the brawling torrent; but before approaching them, you discover with surprise that the daring foot of man has ventured to descend the steep bank, to erect a cluster of mills, which dip their water wheels into the impetuous rapid.

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In my first visit I was quite alone, and piloted my way from the tavern to the edge of the precipitous bank, by the directions which I received from the landlord. Crossing a field or two, which slope from the road towards the river, a little below the falls, I reached a small distillery, past which a kind of foot path

conducts to the edge of the bank. The ground is marshy for a considerable space up and down, with a good deal of brushwood scattered about, but part of it had been cut away from the brow of the precipice, to afford a view of the falls. 1818 Duncan

. . . . .

Turning to the right I followed a narrow path, which skirted the edge of the bank; but stepped slowly and with caution, for I had read alarming accounts of the abundance of rattlesnakes in this quarter. . . . Before reaching the Table Rock, as it is called, at which this path terminates, I stopped behind a few bushes upon a projecting edge, from which I enjoyed a commanding prospect of the wonders before me.

. . . . .

During the summer, the American newspapers had announced that the whole of the Table Rock had given way, and been precipitated into the channel of the river; I was therefore eager to ascertain the extent of the mischief. We got over the rail fences of two fields, and passing the distillery to which I have already alluded, reached the edge of the precipice. On looking to the right, I at once remarked the great change which had taken place. From within a few feet of where I stood, the bank which had formerly run forward nearly in a straight line towards the Table Rock, now presented a great concavity. The foot path along which I had formerly walked, and the bushes behind which I had stood, had all disappeared:— the rock upon whose deceitful support they rested, had suddenly given way, from top to bottom, and a mass, as we were informed, about 160 feet in length, and from 30 to 40 in breadth, upon which I had formerly imagined myself in security, now lay shattered into ten thousand fragments at the bottom of the precipice. . . .

The final disruption of this mass took place about midnight in the month of July or August. . . .

A new path, winding considerably backward from the brow of the cliff, has been cut through the brushwood with which the marsh abounds, and a line of planks conducts the traveller to the

1818
Duncan

Table Rock. The rent extended to within a few yards of this celebrated spot, but no part of it gave way; how long it may be ere it does so, none can say.

The top of the Table Rock forms a circular platform of considerable area, on the same level, and in immediate contact, with the western extremity of the British fall. It extends backward for several yards, and I put the point of my shoe into the water, with perfect safety, immediately before it was precipitated from the cliff. In front the rock projects some feet beyond the line of the fall, and of the inferior mass of rocks upon which it is supported; it requires not a little nerve to approach the edge, but the landlord told us that he has seen people sitting with their feet hanging over it, coolly engaged in sketching a view of the falls.

. . . . .

Leaving the Table Rock we returned by the winding foot path, and a short way below the road from the distillery we reached the ladder, which conducts to the bed of the river. I had imagined that there must be a good deal of danger connected with descending, but on the contrary it is perfectly safe. The top of the ladder is secured between the stumps of two trees, against the side of a deep gash in the rock, and slopes down along the face of the precipice, the lower end resting upon a large accumulation of soil and rock which has formerly fallen from above.

There is some difficulty however in getting forward, after having arrived at the foot of the ladder. The path lies to the right along a sloping bank of earth and stones, alternately rising and falling, though ultimately descending as you approach the falls. The footway is so narrow that it admits of no more than one abreast; it is besides wet and slippery throughout, and in many places encumbered with fragments of rock. To look up is frightful; in some places the higher stratum of rock overhangs the rest most threateningly, and the fissures are so numerous, that the whole fabric of the bank seems to be held together by a most

FALLS OF NIAGARA

From an Italian engraving by G. M. Terreni, 1763. Evidently adapted from Hennepin

precarious cohesion. Your progress is also impeded by the thick rain which is every where descending; sometimes filtering through the seams of the rock, sometimes falling in heavy drops from its edge, as from the eaves of a house, and in two or three places spouting upon you in a continued stream. This water proceeds from the marsh above, and by gradually washing out the earth was doubtless the cause of the bank's giving way last summer. 1818 Duncan

. . . . .

Various opinions prevail as to the most favourable situation for viewing the falls. Some prefer the road to Chippawa, some the Table Rock, some the rising bank above it, and some the bottom of the precipice. The view from the road to Chippawa is the one which a traveller from Buffalo first obtains; and after the mind has become familiar with the other aspects of the scenery, and can mentally associate what is hid with what is seen, perhaps the circumstance of its having been the first view, may induce him to think it the best. From the Table Rock the spectator has a more complete view of the great fall; commanding at the same time the whole of the furious rapid above, from the first tumultuous roll of the waves, down through its foaming course, till it subsides at the middle of the curve into momentary smoothness, and then dashes below. Here also he has a more appalling impression of the terrors of the scene, for the look from the edge of the rock down into the abyss, is certainly without a parallel. Altogether however he is too close upon the great fall, while the one on the American side seems but an episode to the other. From the rising bank above the Table Rock there is perhaps a better grouping of the various features of the landscape; but then you are elevated considerably above the most important objects, a situation which is fatal to powerful impression from objects either of nature or art. At the bottom of the precipice you more adequately appreciate the vastness of the foaming cataracts, their tremendous sound, the terror of the impending precipice, and the boiling of the mighty flood, but to these characteristics your view is confined.

1818 Duncan

The truth is that you must contemplate the scene from every point of view, before you can be acquainted with half its grandeur. Every succeeding look, and every shifting of your position, exhibit something which you did not observe before, and I believe that those who have visited the falls the oftenest, admire and wonder at them the most. . . .

For the disappointment which is usually felt in gaining the first look of the falls, it is not difficult to account. We are accustomed to expect that the peculiar beauties of " the mountain and the flood " should never be disconnected in the landscape, and are not prepared to find the falls of Niagara in the midst of a tract of country level to perfect deadness; a country where for miles around not a solitary hillock varies the surface, and nothing meets the eye but interminable forests of pine. The positions from which you must view the falls, and their vast semicircular width, detract most surprisingly from their apparent altitude. Add to all this, the unbridled scope in which imagination delights to riot, magnifying what is small and exaggerating what is great, and surely it will no longer be surprising that many, who take but a flying view of the wonders of Niagara, should depart utterly displeased that they are not still more wonderful.

1818 Evans

EVANS, ESTWICK. A pedestrious tour, of four thousand miles, through the western states and territories, during the winter and spring of 1818. Concord, N. H.: Joseph C. Spear. 1819. Pp. 76–81. (Thwaites, Early western travels, 1748–1846. 8:174–177.)

The writer deemed a detailed account of the Falls unimportant. He confines himself to a brief description of the rapids, islands and river, and some remarks on recession.

1818 Howison

HOWISON, JOHN. Sketches of Upper Canada, domestic, local, and characteristic: to which are added, practical details for the information of emigrants of every class; and some recollections of the United States of America. 2d ed. Edinb.: Oliver & Boyd. 1822. Pp. 106–130.

The Table Rock, from which the Falls of Niagara may be contemplated in all their grandeur, lies on an exact level with the edge of the cataract on the Canada side, and indeed forms a part of the precipice over which the water gushes. It derives its name

from the circumstance of its projecting beyond the cliffs that support it like the leaf of a table. To gain this position, it is necessary to descend a steep bank, and to follow a path that winds among shrubbery and trees, which entirely conceal from the eye the scene that awaits him who traverses it. When near the termination of this road, a few steps carried me beyond all these obstructions, and a magnificent amphitheatre of cataracts burst upon my view with appalling suddenness and majesty. However, in a moment the scene was concealed from my eyes by a dense cloud of spray, which involved me so completely, that I did not dare to extricate myself. A mingled rushing and thundering filled my ears. I could see nothing except when the wind made a chasm in the spray, and then tremendous cataracts seemed to encompass me on every side, while below, a raging and foamy gulf of undiscoverable extent lashed the rocks with its hissing waves, and swallowed, under a horrible obscurity, the smoking floods that were precipitated into its bosom. 1818 Howison

At first the sky was obscured by clouds, but after a few minutes the sun burst forth, and the breeze subsiding at the same time, permitted the spray to ascend perpendicularly. A host of pyramidal clouds rose majestically, one after another, from the abyss at the bottom of the Fall; and each, when it had ascended a little above the edge of the cataract, displayed a beautiful rainbow, which in a few moments was gradually transferred into the bosom of the cloud that immediately succeeded. The spray of the Great Fall had extended itself through a wide space directly over me, and, receiving the full influence of the sun, exhibited a luminous and magnificent rainbow, which continued to over-arch and irradiate the spot on which I stood, while I enthusiastically contemplated the indescribable scene.

. . . . .

The body of water which composes the middle part of the Great Fall is so immense, that it descends nearly two-thirds of the space, without being ruffled or broken and the solemn calmness with which it rolls over the edge of the precipice is finely contrasted with the perturbed appearance it assumes after having

1818
Howison

reached the gulf below. But the water towards each side of the Fall is shattered the moment it drops over the rock. . . . The surface of the gulf below the cataract presents a very singular aspect; seeming, as it were, filled with an immense quantity of hoar frost, which is agitated by small and rapid undulations. The particles of water are dazzlingly white, and do not apparently unite together, as might be supposed, but seem to continue for a time in a state of distinct comminution, and to repel each other with a thrilling and shivering motion which cannot easily be described.

. . . . .

The road to the bottom of the Fall presents many more difficulties than that which leads to the Table Rock. After leaving the Table Rock, the traveller must proceed down the river nearly half a mile, where he will come to a small chasm in the bank, in which there is a spiral staircase enclosed in a wooden building. By descending this stair, which is seventy or eighty feet perpendicular height, he will find himself under the precipice on the top of which he formerly walked. . . . As the traveller advances, he is frightfully stunned by the appalling noise; clouds of spray sometimes envelope him, and suddenly check his faltering steps,— rattlesnakes start from the cavities of the rocks, and the scream of eagles soaring among the whirlwinds of eddying vapour which obscure the gulf of the cataract, at intervals announce that the raging waters have hurled some bewildered animal over the precipice. After scrambling among piles of huge rocks that obstruct his way, the traveller gains the bottom of the Fall, where the soul can be susceptible only of one emotion,— that of uncontrollable terror.

It was not until I had, by frequent excursions to the Falls, in some measure familiarized my mind with their sublimities, that I ventured to explore the *penetralia* of the Great Cataract. The precipice over which it rolls is very much arched underneath, while the impetus which the water receives in its descent projects it far beyond the cliff, and thus an immense Gothic arch is formed by the rock and the torrent. Twice I entered this cavern, and

twice I was obliged to retrace my steps, lest I should be suffocated by the blast of dense spray that whirled around me; however, the third time, I succeeded in advancing about twenty-five yards. Here darkness began to encircle me; on one side, the black cliff stretched itself into a gigantic arch far above my head, and on the other, the dense and hissing torrent formed an impenetrable sheet of foam, with which I was drenched in a moment. The rocks were so slippery, that I could hardly keep my feet, or hold securely by them; while the horrid din made me think the precipices above were tumbling down in colossal fragments upon my head. 1818 Howison

. . . . . .

. . . Dead wild-ducks are found in great numbers along the banks of the river, near the bottom of the cataract, on the mornings that succeed dark and stormy nights. Some people suppose that these animals are carried over while asleep; but more probably they get entangled among the rapids above, and are swept away before they are aware of their danger.

. . . . . .

. . . Goat Island lies about a thousand feet from the American shore; and such is the velocity of the current between the two banks, that most people would consider the scheme of raising a bridge there altogether chimerical, were not the thing already effected. Mr Porter first placed his bridge near the upper extremity of the island, but the ice destroyed it; however, he soon, with admirable spirit and perseverance, commenced another on a better plan, and in a more advantageous situation. This structure, which is now completed, combines, in an eminent degree, both strength and simplicity. Each of the piers is formed of a very strong wooden box, filled with large stones and gravel, sunk in the river, upon which is placed the body of the bridge, consisting of plank, and sufficiently strong and wide to admit carriages of any description. The greatest depth of water under it is about seven feet, and the velocity of the current perhaps exceeds eighteen knots an hour.

Goat Island contains about seventy acres of excellent soil, and is covered with fine timber. A carriage-road winds around it,

1818
Howison

from which small paths diverge, leading to those parts of its rocky shores, where the different aspects of the Falls and Rapids may be viewed to most advantage. The beauties of this island are equally numerous and enchanting — the variety of prospect it affords is indescribable — the luxuriance and verdure which crown its banks bespeak a paradise; while the wild flowers that adorn them, and are nourished by the spray of the cataract, appear to possess a fragrance and a beauty altogether peculiar and exquisite. Oft-times volumes of snow-white vapour, among which the prismatic colours appear with changeful lustre, float along the cliffs of the island, gloriously enveloping them in the effulgence of heaven, and, as it were, isolating the terrestrial elysium which they encircle in the bosom of clouds, lest its delights should become common to the rest of the world.

. . . . .

A little way above the Falls, the Niagara river expands into a breadth of two miles, and flows with such a gentle current and placid smoothness, that it resembles a small lake. The American shore is covered with trees, but is unenlivened by houses or inhabitants; while the mingled murmur of the Rapids and cataracts, and the occasional shriek of the wild-duck, are alone heard by him who contemplates the scene; which appears the more delightful, in consequence of its meeting the eye of the traveller immediately after he has been stunned and astonished by the grandeur of the Falls. Thus, two aspects of nature, one the most terrific and tumultuous, the other the most composing and quiet, are to be found within the short compass of a mile, individually forming a contrast equally agreeable and unanticipated.

"The author spent two years and a half in Upper Canada, and, in the course of that time, resided in various parts of the province." He was at the Falls in 1818. His narrative is interesting and trustworthy enough though he seems sometimes to indulge in description for literary effect merely.

1818
Milbert

MILBERT, J. Itinéraire pittoresque du fleuve Hudson et des parties latérales de l'Amérique du Nord, d'après les dessins originaux pris sur les lieux. Paris: Henri Gaugain et Cie. 2:187–204.

"Apres avoir fait connaitre au lecteur le mecanisme, la disposition et les dimensions de la cataracte et de ses principaux accessoires, il nous resterait à lui presenter, dans tout son ensemble, sa grandeur et son mouvement, ce vaste et prodigieux tableau." Words fail him, so he quotes Isaac Weld instead. 1818 Milbert

WATSON, WINSLOW C., *editor.* Men and times of the Revolution; or, Memoirs of Elkanah Watson, including journals of travels in Europe and America, from 1777 to 1842. . . . N. Y.: Dana and Co. 1856. Pp. 416–417. 1818 Watson

The record of a visit made in June, 1818. The author refrains from description but confesses himself disappointed. He was apparently more interested in the battlefields near the Falls than in the Falls themselves.

1819

DALTON, WILLIAM. Travels in the United States of America and part of Upper Canada. . . . Appleby. (Eng.): R. Bateman. 1821. 1819 Dalton

The writer visited the Falls in July, 1819, clambering about and lingering as long as he could. Though he found the sight "awful in extreme" and the shock "electrifying," his account is well restrained and shows the interested observer.

HARRIS, WILLIAM TELL. Remarks made during a tour through the United States of America in the years 1817, 1818 and 1819. . . . Lond.: Sherwood, Neely and Jones. 1821. Pp. 164–167. 1819 Harris

A brief and rather inconsequential account in a letter to a friend, under date of April, 1819.

1820

HODGSON, ADAM. Letters from North America, written during a tour in the United States and Canada. Lond.: Hurst, Robinson and Co. 1824. 2:342–359. 1820 Hodgson

An account of two visits to the Falls made in August, 1820, interspersed with historical and biographical matter more or less extraneous.

1821

DEWEY, MARY E., *editor.* Life and letters of Catharine Sedgwick. N. Y.: Harper. 1871. Pp. 130–132. 1821 Dewey

A charming and sprightly account of a visit made in July, 1821.

1821
Stansbury

STANSBURY, PHILIP. A pedestrian tour of two thousand three hundred miles, in North America. To the Lakes,— the Canadas,— and the New England States. Performed in the autumn of 1821. N. Y.: Meyers and Smith. 1822. Pp. 100–114.

It is quite evident from this description that Niagara was becoming more and more accessible.

. . . The American fall, is one hundred and sixty-two feet: the sheet of water, however, is thin, and the spray which is formed scarcely rises to the top. The Horse-shoe fall creates a deep stunning roar, and whirls its spray volume after volume, a thousand feet into the air, till it seems to mingle with the clouds above. Fantastic shapes, giants, towers and sea-monsters, may be descried upon the spray, as it swells dark and watery upon the atmosphere. Sometimes a majestic being seems to rise, with his arms outstretched and his wings gradually expanding: his head strikes the clouds and slowly separates from the body. Now the wings and arms spread and become the boughs of a tree, waving in the wind and bending from its violence. Suddenly the mist rolls in thick folds from beneath, like the smoke of a house in flames, and mounting higher and higher assumes the form of a straight upright column, supporting the arch of the heavens. The column breaks, and as if its demolition had raised a dust from its ruins, new volumes ascend and afford new employment to the fancy.

Having amused myself long enough in tracing figures in the spray, and surveying the streaming chute, rendered by the mid-day sun of a most dazzling brightness, I advanced along the brink, and found myself all of a sudden, in a pleasant grove of trees, with their roots washed by the waves of the river, which spreads like a boiling ocean immediately above the falls. This is an astonishing scene: billows rebounding back from concealed rocks, dash aloft and hide the prospect of the opposite shores: islands and clumps of rocks and trees, lay scattered among them, feebly endeavouring to stop the irresistible violence of the rapid.

. . . . .

From a collection of mills and factories arranged along the American side of the rapids, denominated Grand Niagara or Manchester, spreads in view the expansive bay, bounded by champaigne lands. Chippewa appears at a distance, scattered about the mouth of Chippewa river; Navy island and the woody shores of the Grand isle, lie at a great distance on the left, and opposite, upon a high bushy bank, Ontario Hotel rears its white colonnades. Midway, firm among the roaring breakers, is Goat or Iris-Island, to the romantic walks of which, a bridge, lately rebuilt by Judge Porter, after passing over an intermediate island, leads from the American shore. It was not without terror that I saw the violent surges beating against the slender props of this bridge, and within a stone's throw of the river leaping into the yawning gulf and involving the objects beneath in dense vapours. The small island across which the bridge passes, is called Bath-Island, and has upon it the toll-keeper's dwelling and a commodious bathing house. Parties, in summer, after refreshing themselves at the intermediate island, stroll among the retired groves of Iris island, where from a precipice of two hundred feet between the two falls, an interesting view of both sheets tumbling on the right-hand and left is obtained. There is a beautiful seclusion. While the foot-step is led by paths, among the gloomy trunks of large forest trees, one of the grandest objects of nature shows, at times, white through the bushes, and with its solemn roar, impels the mind to contemplation and awe. Adjacent, are the other little islands, with their close planted firs expanding over banks, upon which neither man or quadruped has ever yet dared to step, and deform the rustic elegance of nature.

1821 Stansbury

For the convenience of descending to the bottom of the falls, permanent stairways have been durably fixed against the sides of the precipice. From the foot of the stairs, down the slope, steps are made of rough stones, with a rude banister for a support, leading to a ferry-boat on the shore. The Charon of the stream,

1821
Stansbury

as I descended the steps, was standing at a sort of reel, with which he draws the boat out of the water, awaiting with patience the approach of adventurous passengers.

. . . . .

Various kinds of trees have fixed their roots beneath the impending cliffs, at a distance below the falls. Nearer and occasionally receiving the sprinklings of the mist, shrubs and flowering plants, in the highest perfection, lift their bright luxuriant heads above the broken stones. Each crevice, and each spot of earth, on this fertile though rugged part of the slope, is a garden of the sweetest, gayest flowers of the forest. Under the continually showering spray, vast rhomboidal rocks which earthquakes have shaken from the summit, are covered with long bending grass, and the watery interstices among them are filled with aquatic weeds.

Here from the top of a huge block of limestone, I viewed with dumb amazement the falls overhead: thundering tumult shakes the basis of the cliffs; a powerful breeze assaults the face, blowing at times rolling clouds of spray. White and foaming, the cataract is just perceived pitching over and breaking apart ere it is half way to the bottom: dazzling mist envelopes the sight, and nothing more is to be seen. Turning around as the spray showers from above, the thin form of the rainbow, like some etherial spirit, sweeps its radiant circles through the air.

. . . . .

. . . Down drop the brimful oceans, crash upon crash, loud peal the hollow rattling thunders. As a thousand crags rifted at once by lightning from the top of a lofty mountain, dart headlong, crumbling, to the distant valley, and reiterating with deafening loudness, stupify the dismayed inhabitant over whose head they rebounded; so flies Niagara over us desperately swift; and madly bellowing as it recoils high above the trembling earth, astounds the affrighted senses of the presumptuous mortals, who thus dare to break into this worse than Tartarean dungeon. An

awful plunge! Dreadful uproar echoes round the deep abyss, whilst the never-ceasing war of jarring elements, break, quiver, burst, and roll around — 1821 Stansbury

> As if the phrenzi'd demons of the air
> Loos'd from their chains of adamant had met
> In fierce encounter.

Mingling yells and groans of horror, appear to unite with the clash of sparkling armour, and the angry spirits of the torrent, from their watery caverns, seem to exclaim loud and threatening, begone! — We obey the summons and hurrying precipitately away, regain a more secure and comfortable station.

. . . . .

Fishes without life, parts of animals, and the limbs of human beings, it is said, are sometimes found washed on the shore.

1822

(Blane, William Newnham.) An excursion through the United States and Canada during the years 1822–1823. Lond.: Baldwin, Craddock and Joy. 1824. Pp. 393–406. 1822 Blane

Gives the author's first impressions of the Falls — "indescribable sensations of admiration and delight," with an account of the trip under the Falls, the ferry, and the whirlpool. He considers it "worth a long journey to see only the rapids above."

Flint, James. Letters from America, containing observations on the climate and agriculture of the western states, the manners of the people, the prospects of emigrants. . . . Edinb.: W. and C. Tait. 1822. Pp. 290–294. (Thwaites, Early western travels, 1748–1846. 9:317–320.) 1822 Flint

A good account by a discriminating Scotch traveler who saw the Falls with sympathetic and discerning eye. Evidently the falls were much frequented even in those days, for he writes: "The falls of Niagara are much visited by strangers, as during our short stay there we met with several persons who were examining them. There is a large tavern on each side of the river, and in the *album* kept at one of these, I observed that upwards of a hundred folio pages had been written with names within five months."

1822 Mathews

(MATHEWS.) A summer month; or, Recollections of a visit to the Falls of Niagara, and the lakes. Phila.: H. C. Carey and I. Lea. 1823. Pp. 65–81.

A description of a visit to the Falls in August, 1822, embellished with numerous quotations.

1825

1825 Bernard

BERNARD, DUKE OF SAXE–WEIMAR EISENACH. Travels through North America, during the years 1825 and 1826. Phila.: Carey, Lea and Carey. 1828. 1:75–78.

The German duke could "only gaze, admire, and adore." He was apparently much interested in the burning spring and the lords and ladies who were visiting the Falls while he was there. We learn from his account that even at that early date there was a bath-house and a billiard-room on what is now Green Island.

1825 Levasseur

LEVASSEUR, A. Lafayette en Amérique en 1824 et 1825, ou, Journal d'un voyage aux États–Unis. Paris: Baudouin. 1829. 2:439–444.

Quotation from translation by John D. Godman.

The General could hardly tear himself away from this imposing scene; and I imagine that when he learned that Goat Island, with its appendages, was for sale for ten thousand dollars, he greatly regretted that its distance from France would not permit him to purchase it. In fact it would be a delightful residence; the surface of the ground, which is about seventy-five acres in extent, is covered with vigorous vegetation, the verdure of which, being constantly cherished by a pure and light vapour that arises from the cataract, forms an agreeable retreat during the heat of summer. The surrounding currents of water offer an incalculable moving power for machinery, which might be easily applied to all sorts of manufactures. I do not think that Mr. Porter will long delay to take advantage of the benefits presented by such a spot.

The distinguished Frenchman was at Niagara in 1825. The record of his visit was made by his secretary.

1825 Valero

VALERO, FERNANDO. Bosqejo de la republica de los Estados Unidos de Norte-America. Escrito en Washington por el C. L. Fer-

nando Valero el año de 1825; i publicado en Guatemala en el de 1830. (Guatemala) Impr. de la Union (1830) pp. 1–15. 1825 Valero

In his " Viaga e las Cataractas de Niagara, año de 1825 " pp. 1–15 this Spanish writer and traveler gives a brief description of the Falls, and the impression made upon him of magnificence and sublimity.

1826

DE ROOS, JOHN FREDERICK FITZGERALD. Personal narrative of travels in the United States and Canada in 1826. Lond.: W. H. Ainsworth. 1827. Pp. 151–172. 1826 De Roos

An account of the Falls from various points of view, Canadian and American, by a lieutenant of the Royal British navy and a typical Englishman. We quote only his analysis of his emotions at the Falls. His book had sufficient popularity to carry it through several editions.

My first sensation was that of exquisite delight at having before me the greatest wonder, in my opinion, of the world. Strange as it may appear, this feeling was immediately succeeded by an irresistible melancholy. Had this not continued, it might perhaps have been attributed to the satiety incident to the complete gratification of " hope long deferred; " but so far from diminishing, the more I gazed the stronger and deeper the feeling became. Yet this scene of sadness was strangely mingled with a kind of intoxicating fascination. Whether the phenomenon is peculiar to Niagara, I know not, but certainly it has been generally observed, that the spirits are affected and depressed in a singular manner by the magic influence of this stupendous Fall.

. . . . .

The ascent on the American side is partly contrived by zig-zag paths, and partly by ladders.

GOSSELMAN, KARL AUGUST. Resa i Norra Amerika. Itvenne Delar Nyköping: (P. E. Winge.) 1835. Förra Delen. Pp. 174–224. 1826 Gosselman

WEST, JOHN. The substance of a journal during a residence at the Red River Colony, British North America: and frequent excursions among the north west American Indians, in the years 1820, 1821, 1822, 1823. Second edition, enlarged with a journal of a mission to the Indians of New Brunswick, and Nova Scotia, and the Mohawks on the 1826 West

1826 West — Ouse or Grand river, Upper Canada, 1825, 1826. Lond.: L. B. Seeley and Son. 1827. P. 273.

1827

1827 — American sketches, by a native of the United States. Lond.: John Miller. 1827. Pp. 233–249.

The account contains more about the talkative hotel-keeper and the uncongenial fat lady whom the author met at Niagara than of the Falls.

1827 Bullock — BULLOCK, W. Sketch of a journey through the western states of North America from New Orleans, by the Mississippi, Ohio, city of Cincinnati and Falls of Niagara, to New York, in 1827. . . . Lond.: John Miller. 1827. Pp. xxiii–xxvi. (Thwaites, Early western travels. 19:142–149.)

Bullock's account contains nothing original. By way of description, he quotes at length from Disturnell's *Northern Traveler*.

1827 McKenney — MCKENNEY, THOMAS L. Sketches of a tour to the Lakes. . . . Balt.; F. Lucas. 1827. Pp. 93–99; 429–430.

Two letters written in June and September respectively. The author makes little attempt at description. In his opinion, the Falls must be seen and heard to be appreciated.

1827 — Tour through parts of the United States and Canada. By a British subject. Lond.: Longman, Rees, Orme, Brown, and Green. 1828. Pp. 96–103.

A letter describing the scenery and containing religious reflections.

1827–1828

1827–28 Hall — HALL, BASIL, *Captain*. Travels in North America, in the years 1827 and 1828. Edinb.: Cadell. 1829. 1:177–208; 351–354.

Captain Hall, though much criticised in his day, has a very good Niagara chapter.

On the 29th of June 1827, we went from Lockport to the Falls of Niagara, which infinitely exceeded our anticipations. . . .

In hunting for similes to describe what we saw and heard, we were quite agreed that the sound of the Falls most nearly resembles that of a grist mill, of large dimensions. There is precisely the same incessant, rumbling, deep, monotonous sound, accom-

panied by the tremour which is observable in a building where many pairs of millstones are at work. This tremulous effect extends to the distance of several hundred yards from the river; but is most conspicuous on Goat Island, which stands in the centre between the two Falls. 1827–28 Hall

The noise of the rapids is also loud, but much sharper; and varies a good deal with the situation of the listener. We were walking one day along a path in the woods on the island, at some distance from the great cataract, and there, it struck me, the sound of the rapids resembled not a little the noise caused by a heavy shower of rain on the leaves of a forest, in a calm.

The scenery in the neighbourhood of Niagara has, in itself, little or no interest, and has been rendered still less attractive by the erection of hotels, paper manufactories, saw-mills, and numerous other raw, staring, wooden edifices. . . .

It has been said, that there is always something about a bridge which interests, more or less. If it be not picturesque in itself, it may be curious in its structure; or high; or long; or may possess something or other to attract notice. At all events, the bridge which connects the main American shore with Goat Island is one of the most singular pieces of engineering in the world, and shows, not only much skill and ingenuity, but boldness of thought in its projector, the owner of the island. It is between six and seven hundred feet in length, and is thrown across one of the worst parts of the rapids, not more than fifty yards above the crest of the American Fall. It is made of wood, and consists of seven straight portions, resting on wooden piers so contrived as to have perfect stability, although the foundation on which they rest is extremely unequal. The bed of the river at that place is covered with rounded and angular stones, varying from the size of a wheel-barrow to that of a stage-coach, and either lying side by side, or piled in heaps; so that while the tops of some of them reach within a foot or two of the surface, others lie at the depth of twelve or fifteen feet. Along this rugged and steep bottom, the river dashes in a torrent covered with breakers and foam, at

1827–28
Hall

the rate of six or seven miles an hour, making a noise not unlike that of the sea on a shallow ledge of rocks. . . .

I had the satisfaction of walking over the whole of Goat Island one day with the proprietor, who seemed unaffectedly desirous of rendering it an agreeable place of resort to strangers. He had been recommended, he told me, by many people, to trim and dress it; to clear away most of the woods; and by all means to extirpate every one of the crooked trees. I expressed my indignation at such a barbarous set of proposals, and tried hard to explain how repugnant they were to all our notions of taste in Europe. His ideas, I was glad to see, appeared to coincide with mine; so that this conversation may have contributed, in some degree, to the salvation of the most interesting spot in all America.

On his asking me what I thought he should do, I took the liberty of advising him to let nature alone as to the trees; to make a gravel walk all round the island, broad enough for three persons to walk abreast; to open little paths in the direction of the best situations for seeing the Falls, and having put down half a dozen commodious seats at the said points, to leave all the rest to the choice of the worthy tourists themselves. I had almost forgotten to mention that some one had seriously urged him to place a great tavern immediately over the Horse Shoe Fall; but, for the present at least, his own good taste revolted at such a combination of the sublime and the ridiculous. I have little doubt, however, that this descent, which we know from high authority and example costs but one step, will be made in the course of time. . . .

I visited on three different occasions the extraordinary cave formed between the cascade and the face of the overhanging cliff — first, on the 3d of July, out of mere curiosity; again on the 9th, to try some experiments with the barometer; and lastly, on the 10th, in company with a friend, purely on account of the excitement which I found such a strange combination of circumstances produce. We reached a spot 153 feet from the outside,

or entrance, by the assistance of a guide, who makes a handsome livelihood by this amphibious pilotage. There was a tolerably good, green sort of light within this singular cavern; but the wind blew us first in one direction then in another with such alarming violence, that I thought at first we should be fairly carried off our feet, and jerked into the roaring caldron beneath. This tempest, however, was not nearly so great an inconvenience as the unceasing deluges of water driven against us. Fortunately the direction of this gale of wind was always more or less upwards, from the pool below, right against the face of the cliffs; were it otherwise, I fancy it would be impossible to go behind the Falls, with any chance of coming out again. Even now there is a great appearance of hazard in the expedition, though experience shows that there is no real danger. Indeed the guide, to re-assure us, and to prove the difficulty of the descent, actually leaped downwards, to the distance of five or six yards, from the top of the bank of rubbish at the base of the cliff, along which the path is formed. The gusts of wind rising out of the basin or pool below, blew so violently against him that he easily regained the walk.

1827–28
Hall

This enormous cataract, in its descent, like every other cascade, carries along with it a quantity of air, which it forces far below the surface of the water,— an experiment which any one may try on a small scale by pouring water into a tumbler from a height. The quantity of air thus carried down, by so vast a river as Niagara, must be great, and the depth to which it is driven, in all probability, considerable. It may also be much condensed by the pressure; and it will rise with proportionate violence both on the outside of the cascade, and within the sheet or curtain which forms the cataract.

It had long been a subject of controversy, I was told, whether the air in the cave behind the Falls was condensed or rarified; and it was amusing to listen to the conflicting arguments on the subject. All parties agreed that there was considerable difficulty in breathing; but while some ascribed this to a want of air, others

1827–28
Hall

asserted that it rose from the quantity being too great. The truth, however, obviously is, that we have too much water; not too much air. For I may ask, with what comfort could any man breathe with half a dozen fire-engines playing full in his face? and positively the effect of the blast behind the Falls is just what that awkward ceremony might be supposed to produce. The direction of the wind is first one way and then another, crossing and thwarting, in a very confused style, and flinging the water sometimes up, sometimes down, and often whirling it round and round like smoke, in curls or spirals, up to the very top of the cave, a hundred feet above our heads, to the very edge of the precipice, over which we could distinctly see the river projected forwards, and just beginning to curve downwards. By the way, I took notice that, exactly in proportion to the apparent thickness of the mass of water, so it continued united after passing the brink. But I do not think at any part of Niagara the sheet of falling water remains unbroken for more than twenty feet, and that only at one place, well known by the name of the Green Water — the most sublime and impressive part of the whole Fall. At every other, the cascade assumes a snowy whiteness very shortly after it begins to descend. This appearance is aided, no doubt, by the blast of wind which rises from the pool on the outside of the sheet; for I observed that the external surface of the cataract was roughened, or turned upwards in a series of frothy ripples, caused either by its friction against the air through which it was passing, or more probably by the blast rising upwards from the pool.

I remarked another singular phenomenon, which I have not happened to hear mentioned before, but which is evidently connected with this branch of the subject. A number of small, sharp-pointed cones of water are projected upwards from the pool, on the outside of the Fall, sometimes to the height of a hundred and twenty feet. They resemble in form some comets of which I have seen drawings. Their point, or apex, which is always turned upwards, is quite sharp, and not larger, I should

say, than a man's fingers and thumb, brought as nearly to a point as possible. The conical tails which stream from these watery meteors may vary from one or two yards to ten or twelve, and are spread out on all sides in a very curious manner. 1827–28 Hall

The lower part of the Fall, it must be observed, is so constantly hidden from the view by a thick rolling cloud of spray, that during ten days I never succeeded once in getting a glimpse of the bottom of the falling sheet; nor do I believe it is ever seen. Out of this cloud, which waves backwards and forwards, and rises at times to the height of many hundreds of feet above the Falls, these singular cones, or comets, are seen at all times jumping up. The altitude to which they are projected, I estimated at about thirty feet below the top; which inference I was led to by means of the sketches made with the Camera Lucida. I watched my opportunity, and made dots at the points reached by the highest of these curious projectiles. The whole height being between 150 and 160 feet, the perpendicular elevation to which these jets of water are thrown cannot, therefore, be less than 110 or 120 feet above the surface of the pool.

The controversy respecting the elasticity of the air behind the Fall, was soon settled. I carried with me a barometer made expressly with a view to this experiment. It was of the most delicate kind, and furnished with two contrivances absolutely indispensable to the accuracy of experiments made under such circumstances. The first of these was a circular spirit-level placed on the top of the frame holding the tube, by which the perpendicularity of the instrument was ascertained; and secondly, an arrangement of screws near the point of support, by which the tube, when duly adjusted, could be secured firmly in its place. By the help of these two inventions of Mr. Adie of Edinburgh, this instrument can be used with confidence, although exposed to such furious storms of wind and rain, as that I have just been describing. These simple additions to the barometer, it may be mentioned, give great facility to observations made for the determination of the height of mountains, as it secures the

1827–28
Hall

correct position of the instrument, however windy the station may be.

The mercury stood, at two stations on the outside, at 29.68. The instrument was then carried behind the Falls and placed near the Termination Rock, as an impassable angle of the cliff is called, which lies at the distance of 153 feet from the entrance, measuring from the Canadian or western extremity of the Great Horse Shoe Fall. It now stood at about 29.72. The thermometer in both cases being at 70. of Fahrenheit. The inner station was probably ten or twelve feet lower than the external one; and it will be easily understood, that in such a situation, with a torrent of water pouring over the instrument and the observer, and hard squalls or gusts of wind threatening to whisk the whole party into the abyss, there could be no great nicety of readings. I observed, that within the Fall, the mercury vibrated in the tube about four hundredths of an inch, and was never perfectly steady; the highest and lowest points were therefore observed by the eye, and the mean recorded. During the external observations there was only a slight tremor visible on the surface of the column. In order to prevent mistakes, I repeated the experiment at another spot, about 120 feet within the entrance, when the mercury stood at about 29.74. though still vibrating several hundredths of an inch. Upon the whole, then, considering that the inner stations were lower than the external one, the small difference between the external and the internal readings may be ascribed to errors in observation, and not to any difference in the degree of elasticity in the air without and within the sheet of falling water.

Though I was only half an hour behind the Fall, I came out much exhausted, partly with the bodily exertion of maintaining a secure footing while exposed to such buffeting and drenching, and partly, I should suppose, from the interest belonging to this scene, which certainly exceeds any thing I ever witnessed before. All parts of Niagara, indeed, are on a scale which baffles every attempt of the imagination to paint, and it

were ridiculous, therefore, to think of describing it. The ordinary materials of description, I mean analogy, and direct comparison with things which are more accessible, fail entirely in the case of that amazing cataract, which is altogether unique. 1827–28 Hall

Yet a great deal, I am certain, might be done by a well-executed panorama, drawn from below, at a station near the projecting angle of the rock which must be passed, after leaving the bottom of the ladder, on the way to the cave I have been speaking about. An artist, well versed in this peculiar sort of painting, might produce a picture which would probably distance every thing else of the kind. He must not, however, trust to the sketches of others, but go to the Falls himself; and there become acquainted with those feelings which the actual presence of that stupendous scene is capable of inspiring. For without some infusion of these local sentiments into his painting, were it ever so correct in outline, the result would be nothing but a large picture of a large waterfall, instead of the noblest, and perhaps the most popular of those singular works of art, which, by a species of magic, transport so many distant regions to our very doors. . . .

On Sunday night, the 8th of July, we returned to the Falls, and walked down to the table rock to view them by moonlight. Our expectations, as may be supposed, were high, but the sight was even more impressive than we had expected. It possessed, it is true, what may be called a more sober kind of interest than that belonging to the wild scene behind the sheet of water above described. I may mention one curious effect: It seemed to the imagination not impossible that the Fall might swell up and grasp us in its vortex. The actual presence of any very powerful moving object, is often more or less remotely connected with a feeling that its direction may be changed; and when the slightest variation would evidently prove fatal, a feeling of awe is easily excited. At all events, as I gazed upon the cataract, it more than once appeared to increase in its volume, and to be accelerated in its velocity, till my heated fancy became strained,

1827–28
Hall

alarmed, and so much overcrowded with new and old images,— all exaggerated,— that in spite of the conviction that the whole was nonsense, I felt obliged to draw back from the edge of the rock; and it required a little reflection, and some resolution, to advance again to the brink. . . .

On the 1st of August, 1827, I drove once more to the Falls, intending merely to bid good-by to them, and come away. I therefore left the carriage at the top of the bank, and said to the coachman that he need not take out his horses, but wait in the shade before the inn, till I came up again from the Table Rock. This was at noon, but it was not till three o'clock that I could disentangle myself from the scene. Indeed, to speak without exaggeration or affectation, I must own, that upon this visit — the last, in all human probability, I shall ever pay to these Falls, I was almost overwhelmed — if that be the proper word to use — with the grandeur of this extraordinary spectacle. I felt, as it were, staggered and confused, and at times experienced a sensation bordering on alarm — I did not well know at what — a strong mysterious sort of impression that something dreadful might happen. At one moment I looked upon myself as utterly insignificant in the presence of such a gigantic, moving, thundering body — and in the next, was puffed up with a sort of pride and arrogant satisfaction, to think that I was admitted into such company, and that I was not altogether wasting the opportunity:— at others I gave up the reins of my imagination altogether, and then tried to follow, but with no great success, some of the innumerable trains of wild and curious reflections which arose in consequence — though, after all, nothing can be conceived more vague than those wandering thoughts, except it be their present ghostlike recollection.

During these three hours, which I am disposed to reckon as the most interesting of my whole life, my mind was often brought back from such fanciful vagaries with a sudden start — only, however, to relapse again and again. More than once I really almost forgot where I was, and became more than half uncon-

scious that I saw millions on millions of tons of water dashing down before me at every second, at the distance of only a few yards;— and even ceased to recollect that the sound I heard came from the greatest cascade in the world. Still, however, in spite of these abstractions — which I made no attempt to restrain — I was all the while sensible that something very delightful was passing. 1827–28 Hall

The effect of this mighty cataract upon the mind, might perhaps be worthy of the attention of a metaphysician. With me, at least, the influence of one overpowering but indefinite sensation at times absorbed the active operation of the senses, and produced a kind of dizzy reverie, more or less akin to sleep, or rather to the intoxication described by opium eaters, during which a thousand visions arose connected with the general sentiment of sublimity. And it may help to give some idea of the extravagant length to which the over-indulged fancy can carry the dreamer on such occasions, to mention that once, for some seconds, I caught myself thinking that I had fairly left this lower world for the upper sky,— that I was traversing the Heavens in company with Sir Isaac Newton,— and that the Sage was just going to tell me about the distance of the fixed stars!

The awakening, if so it may be called, from these roving commissions of the mind, to the stupendous reality, so far from being accompanied by the disappointment which usually attends the return voyage from these distant regions in the world of fancy, was gratifying far beyond what I remember to have experienced upon any former occasion, during a life of pretty constant and high enjoyment.

This, and a hundred other extravagancies which I could add upon the subject, however absurd they must of course seem in sober prose, may possibly give some notion of the effect produced by looking at the Falls of Niagara — an effect analogous, perhaps, to that produced on the mind of the poet by ordinary circumstances, but which less imaginative mortals are made conscious of, only on very extraordinary occasions.

1828

1828 Flint

FLINT, TIMOTHY. (Niagara Falls in 1828.) (Western monthly review. Cincinnati. 2:255–260.)

He does not attempt any extended description of the Falls but refers to that which had been written earlier and before he had seen the Falls for his *Geography and History*. "He must have been obtuse of brain and of heart," he writes, "who could have thus contemplated this spectacle alone in this repose of nature, under the light of the moon, and the blue stars twinkling in the cloudless dome of the firmament, and not have thoughts which the poverty of language can never clothe in words."

1828 Kirkpatrick

KIRKPATRICK, JOHN ERVIN. Timothy Flint, pioneer, missionary, author, editor, 1780–1840. . . . Cleveland: Arthur H. Clark Co. 1911. Pp. 198–199.

1828 Stuart

STUART, JAMES. Three years in North America. 3d ed. rev. Edinb.: Robert Cadell; Lond.: Whittaker and Co., 1833. 1:138–145.

Stuart was a Scotch visitor to the United States who wrote for the information of emigrants and tourists. His visit to Niagara Falls in September, 1828, is conscientiously chronicled. By his own account, he made great use of Darby's *View of the United States* and of Flint's *Geography and History of the Western States*. He also quotes descriptive passages from other writers.

1829

1829 Stone

STONE, WILLIAM LEETE. From New York to Niagara. Journal of a tour, in part by the Erie canal, in the year 1829. (Buf. hist. soc. pub. 1910. 14:238–250.)

The account may also be found in the Magazine of American History for October and December, 1888 (20:315 and 489–492). It is by one of the most notable authors and journalists of early New York and describes Niagara Falls and scenery at some length and in lively style. We quote only the author's account of his own feelings and such historical incidents as are not elsewhere touched upon.

We rode on to the Falls in a light open waggon, drawn by a pair of Canadian ponies. The sun sunk to his nightly rest, as we ascended the heights, tinging with his golden hues the top of the noble column of granite, reared to the memory of Brock.

the British commander, who fell in the battle to which I have just referred. . . . The country is very level to the falls. 1829 Stone

During the last mile of our ride, we passed over the ground memorable as the scene of the bloody battle of Bridgewater, as it is called in our annals — in the British it is called the Battle of Lundy's Lane. It was here that Brown and Scott, and the troops and commanders on both sides, covered themselves with renown; for never was a battle more fiercely and obstinately contested, and both armies claimed a brilliant victory!! The moon shone out, though rather obscurely, as we reached Forsyth's Hotel, near the Falls, for some time previously to which our ears has been filled with the heavy sound of the rush of mighty waters. Without looking at the river, however, we took supper, and retired to our apartment, which we found to overlook the far-famed cataract. I repressed my curiosity and did not lift a curtain, being resolved not to dissolve the charm of a first look upon the mighty, the glorious whole! But the roar of the tumbling torrent long banished sleep from my pillow; and when all was quiet and still in the house, I could distinctly feel that the earth, and the building and my own body trembled. And when some fitful slumbers stole over me, it was only to dream of whirlpools, cliffs, crags and cataracts.

Tuesday, Oct. 6. Breakfasted at 8, and after surveying the rapids above the principal proemption from the veranda of the pavilion, we descended the high and steep bank to the Table Rock, from which the best view of the Great Cataract, on both sides of Goat Island is obtained, unless it be from below. It was fortunate for us, perhaps, that while surveying the rapids, from the piazza of the Pavilion, the heavy and dense clouds of vapour which arose from the cauldron into which the torrent pours, effectually obscured the broken view of the main fall which otherwise would have been presented from that situation. Meantime the rapids themselves, where the torrent rushes impetuously onward, leaping in foaming billows from rock to rock for a distance of more than a mile, during which period it descends

1829 Stone

more than 140 feet, afforded a prospect sufficiently interesting to render the senses keenly alive to the more sublime and glorious spectacle that was to come. Arrived at Table Rock, we were struck silent and breathless for some moments, with wonder and dread admiration of this stupendous monument of almighty power. It seemed, indeed (to borrow the metaphor of my lamented friend, Brainard), as though

"God poured the waters from his hollow hand!"

And the evident ravages which the heavy and resistless torrent has made in the crumbling rocks, at once illustrated the fitness of the other figure of the same beautiful bard, where he speaks of these waters as

"Notching the centuries in the eternal rocks."

. . . . .

I spent the greater part of three days in viewing this wonderful curiosity from different points of observation — above and below, on both sides of the river, upon Goat Island, and at its base, and from the Terrapin rocks on the northern side of the island, at the brink of the proemption; and each moment so occupied was of still more thrilling interest — of more special wonder — of higher and more elevated enjoyment. And when at last I had the last, and yet another, and still another last look — my desire for another visit was far stronger than for the first.

It was during this sixth of October, that the landlords, on both sides of the river got up a variety of shows, by attempting to add such interest to the natural glories of the place, as it was supposed would collect a multitude of people together upon both shores, and thus give them some additional business in the way of their vocation. For this purpose several rocks were blasted off at various points of the rocks overhanging the gulf. But it was a sorry affair. The gun-powder explosions, in comparison with the majestic roar of the waters, might be likened to the report of so many pop-guns mingling with the thunders of Jove — the tumbling fragments like pebbles cast into the valley from

the brow of Olympus — the smoke, like a capful of fog compared with the volumes rolling up from the crater of Vesuvius. Indeed the whole affair was as contemptible as it would be to attempt to add to the majesty of the cataract the pouring of a bucket of water by its side from a tea-kettle. Several thousands of people, however, collected on both sides, many of whom probably had never before had curiosity enough to see the falls themselves — if even they saw them now. The descent and wreck of the vessel among the rapids, was an interesting spectacle, however. . . . 1829 Stone

Wednesday, Oct. 7. Spent the day in studying the cataract. Crossed to the American side, visited Goat Island, and descended the new stairway at the northern extremity. It is surprising how near to the falls themselves, the adventurous watermen will ply their boats upon the surface of these angry whirlpools, and with perfect safety. The day was dark and rainy much of the time. In the afternoon the celebrated Sam Patch, of jumping notoriety, leapt from a ladder 110 feet high, into the abyss, at the end of Goat Island, and picked himself safely up. The village of Manchester, the seat of the Hon. Augustus Porter, is a brisk and thriving village, with several mills and manufactories. There is no lack of waterpower!

Thursday, Oct. 8. A clear sky and warm sun rendered it an inviting day for a ride, and we availed ourselves of it to visit what is called the Whirlpool, at the distance of five miles below the falls. This is a very wild and romantic spot, and second only in interest to the cataract itself. The whirlpool is formed by the full torrent of the Niagara rushing through a pass narrowed to the toss of a biscuit, into a bay or cove, bounded by high precipitous rocks, and covered perhaps the space of six or eight acres. The river rushes into this cove, with great impetuosity, towards the northwest; and after whirling round in the basin, escapes through another narrow pass, towards the northeast — thus turning an acute angle. The walls of the river are here as lofty, as wild, and as picturesque, as at the cataract;

1829
Stone

and it is altogether a scene of peculiar grandeur. The waters boil darkly up in the bay, as if in great volume, and from immense depths; and some have conjectured that soon after tumbling over the falls, the bulk of the waters are driven through a subterranean channel, from the mouth of which they boil up in this place. The ride through Lundy's Lane and Drummondsville to and from this wild and rarely visited spot, was delightful. We returned to the Pavilion to dinner; and in the afternoon took the stage for Buffalo.

1830

1830
Colton

COLTON, C. Tour of the American lakes, and among the Indians of the North-west territory, in 1830. . . . Lond.: Westley, Davis. 1833. 1:1–11.

A Niagara chapter in enthusiastic style.

1831

1831
Alexander

ALEXANDER, JAMES EDWARD, *Captain.* Transatlantic sketches, comprising visits to the most interesting scenes in North and South America, and the West Indies. Lond.: Bentley. 1833. 2:141–156.

To this British soldier the first view of the Falls in 1831 seemed "more like what one may venture to conceive of what shall afterwards be revealed to the blessed in Paradise, than any other of the most imposing of Nature's works" which he had delighted in visiting. After some description of the scenery, he concludes with an account of the hermit of Niagara.

1831
Fowler

FOWLER, THOMAS. The journal of a tour through British America to the Falls of Niagara . . . written during the summer of 1831. Aberdeen: Smith. 1832. Pp. 214–231.

A painstaking description written for the information of tourist and emigrants. Also an account of the hermit of Niagara written shortly after his death.

1831
Greenwood

GREENWOOD, FRANCIS WILLIAM PITT. Miscellaneous writings. Bost.: Crosby and Nichols. (1846.) Pp. 290–308.

The author visited the Falls in July, 1831. His estimate of the scene is best given in his own words.

It is alone in its kind. Though a waterfall, it is not to be compared with other waterfalls. In its majesty, its supremacy, and its influence on the soul of man, its brotherhood is with the living ocean and the eternal hills. 1831 Greenwood

And the motion of these Falls, how wonderfully fine it is! how graceful, how stately, how calm! There is nothing in it hurried or headlong, as you might have supposed. The eye is so long in measuring the vast, and yet unacknowledged height, that they seem to move over almost slowly; the central and most voluminous portion of the Horseshoe even goes down silently.

TUDOR, HENRY. Narrative of a tour in North America comprising Mexico, the mines of Real del Monte, the United States, and the British colonies, with an excursion to the island of Cuba. In a series of letters written in the years 1831–1832. Lond.: James Duncan. 1834. 1:235–268. 1831 Tudor

The author regaled his "optical as well as moral senses" by the spectacle for a week or more. He recounts at length his experiences and emotions at the various points of view.

1832

FIDLER, ISAAC. Observations on professions, literature, manners, and emigration, in the United States and Canada, made during a residence there in 1832. Lond.: Whittaker, Treacher. 1833. Pp. 209–214. 1832 Fidler

A hearsay account of the hermit of Niagara.

TROLLOPE, FRANCES MILTON. Domestic manners of the Americans. Lond.: Whittaker, Treacher, 1832. Pp. 302–309. 1832 Trollope

A vivacious yet accurate description in excellent style and sympathetic mood.

At length we reached Niagara. It was the brightest day that June could give; and almost any day would have seemed bright that brought me to the object which, for years, I had languished to look upon.

We did not hear the sound of the falls till very near the hotel which overhangs them; as you enter the door you see beyond the hall an open space, surrounded by galleries, one above

1832
Trollope

another, and in an instant you feel that from thence the wonder is visible.

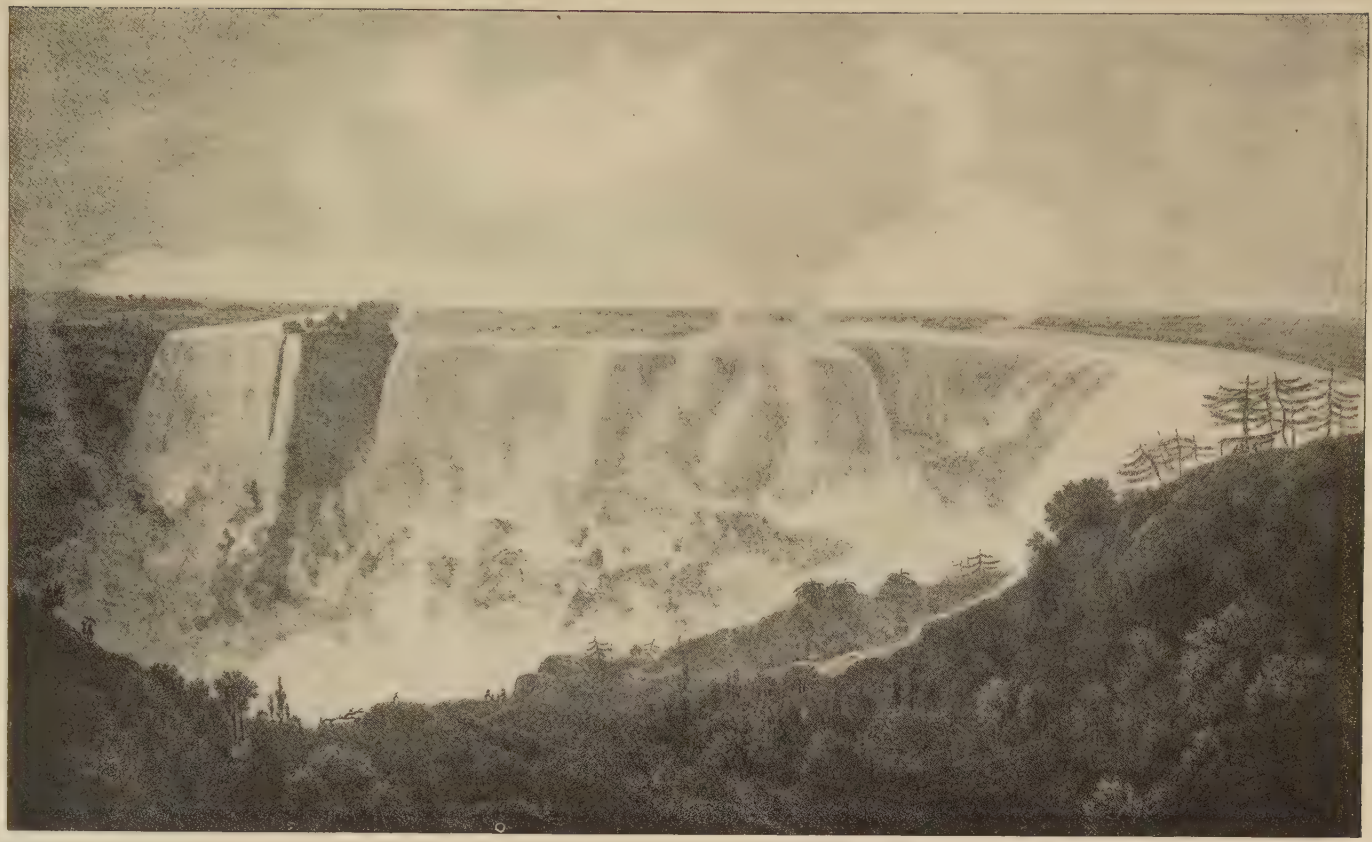
I trembled like a fool, and my girls clung to me trembling too, I believe, but with faces beaming with delight. We encountered a waiter, who had a sympathy of some sort with us, for he would not let us run through the hall to the first gallery, but ushered us up-stairs, and another instant placed us where, at one glance, I saw all I had wished for, hoped for, dreamed of.

It is not for me to attempt a description of Niagara: I feel I have no powers for it.

After one long, steadfast gaze, we quitted the gallery that we might approach still nearer, and in leaving the house had the good fortune to meet an English gentleman, who had been introduced to us at New-York; he had preceded us by a few days, and knew exactly how and where to lead us. If any man living can describe the scene we looked upon it is himself, and I trust he will do it. As for me, I can only say that wonder, terror, and delight completely overwhelmed me. I wept with a strange mixture of pleasure and of pain, and certainly was, for some time, too violently affected in the *physique* to be capable of much pleasure; but when this emotion of the senses subsided, and I had recovered some degree of composure, my enjoyment was very great indeed.

To say that I was not disappointed is but a weak expression to convey the surprise and astonishment which this long dreamed of scene produced. It has to me something beyond its vastness; there is a shadowy mystery hangs about it which neither the eye nor even the imagination can penetrate; but I dare not dwell on this; it is dangerous subject, and any attempt to describe the sensations produced must lead direct to nonsense.

Exactly at the fall, it is the fall and nothing else you have to look upon; there are not, as at Trenton, mighty rocks and towering forests, there is only the waterfall; but it is the fall of an ocean, and were Pelion piled on Ossa on either side of it, we could not look at them.



CATARACT OF NIAGARA

Painted by Richard Wilson: engraved by William Byrne. From a drawing taken on the spot by Lt. Pierie of the Royal Artillery, 1768

1832
Trollope

The noise is greatly less than I expected: one can hear with perfect distinctness every thing said in an ordinary tone, when quite close to the cataract. The cause of this, I imagine to be, that it does not fall immediately among rocks, like the far noisier Potomac, but direct and unbroken, save by its own rebound. The colour of the water, before this rebound hides it in foam and mist, is of the brightest and most delicate green; the violence of the impulse sends it far over the precipice before it falls, and the effect of the ever varying light through its transparency is, I think, the loveliest thing I ever looked upon.

We descended to the edge of the gulf which receives the torrent, and thence looked at the horse-shoe fall in profile; it seems like awful daring to stand close beside it, and raise one's eyes to its immensity. I think the point the most utterly inconceivable to those who have not seen it, is the centre of the horse-shoe. The force of the torrent converges there, and as the heavy mass pours in, twisted, wreathed, and curled together, it gives an idea of irresistible power, such as no other object ever conveyed to me.

The following anecdote, which I had from good authority, may give some notion of this mighty power.

After the last American war, three of our ships, stationed on lake Erie, were declared unfit for service, and condemned. Some of their officers obtained permission to send them over Niagara Falls. The first was torn to shivers by the rapids, and went over in fragments; the second filled with water before she reached the fall; but the third, which was in better condition, took the leap gallantly, and retained her form till it was hid in the cloud of mist below. A reward of ten dollars was offered for the largest fragment of wood that should be found from either wreck, five for the second, and so on. One morsel only was ever seen, and that about a foot in length, was mashed as by a vice, and its edges notched like the teeth of a saw. What had become of the immense quantity of wood which had been precipitated? What unknown whirlpool had engulphed it, so that, contrary to

1832
Trollope

the very laws of nature, no vestige of the floating material could find its way to the surface?

Beyond the horse-shoe is Goat Island, and beyond Goat Island the American fall, bold, straight, and chafed to snowy whiteness by the rocks which meet it; but it does not approach, in sublimity or awful beauty, to the wondrous crescent on the other shore. There, the form of the mighty caldron, into which the deluge pours, the hundred silvery torrents congregating round its verge, the smooth and solemn movement with which it rolls its massive volume over the rock, the liquid emerald of its long unbroken waters, the fantastic wreaths which spring to meet it, and then, the shadowy mist that veils the horrors of its crash below, constitute a scene almost too enormous in its features for man to look upon. "Angels might tremble as they gazed;" and I should deem the nerves obtuse, rather than strong, which did not quail at the first sight of this stupendous cataract.

Minute local particulars can be of no interest to those who have not felt their influence for pleasure or for pain. I will not tell of giddy stairs which scale the very edge of the torrent, nor of beetling slabs of table rock, broken and breaking, on which, shudder as you may, you must take your stand or lose your reputation as a tourist. All these feats were performed again and again, even on the first day of our arrival, and most earthly weary was I when the day was done, though I would not lose the remembrance of it to purchase the addition of many soft and silken ones to my existence.

By four o'clock the next morning I was again at the little shantee, close to the horse-shoe fall, which seems reared in water rather than in air, and took an early shower-bath of spray. Much is concealed at this early hour by the heavy vapour, but there was a charm in the very obscurity; and every moment as the light increased, cloud after cloud rolled off, till the vast wonder was again before me.

It is in the afternoon that the rainbow is visible from the British

side; and it is a lovely feature in the mighty landscape. The gay arch springs from fall to fall, a fairy bridge. 1832 Trollope

After breakfast we crossed to the American side, and explored Goat Island. The passage across the Niagara, directly in face of the falls, is one of the most delightful little voyages imaginable; the boat crosses marvellously near them, and within reach of a light shower of spray. Real safety and apparent danger have each their share in the pleasure felt. The river is here two hundred feet deep. The passage up the rock brings you close upon the American cataract; it is a vast sheet, and has all the sublimity that height and width, and uproar can give; but it has none of the magic of its rival about it. Goat Island has, at all points, a fine view of the rapids; the furious velocity with which they rush onward to the abyss is terrific; and the throwing a bridge across them was a work of noble daring.

Below the falls, the river runs between lofty rocks, crowned with unbroken forests; this scene forms a striking contrast to the level shores above the cataract. It appears as if the level of the river had been broken up by some volcanic force. The Niagara flows out of lake Erie a broad, deep river; but for several miles its course is tranquil, and its shores perfectly level. By degrees its bed begins to sink, and the glassy smoothness is disturbed by a slight ripple. The inverted trees, that before lay so softly still upon its bosom, become twisted and tortured till they lose their form and seem madly to mix in the tumult that destroys them. The current becomes more rapid at every step, till rock after rock has chafed the stream to fury, making the green one white. This lasts for a mile, and then down sink the rocks at once one hundred and fifty feet and the enormous flood falls after them. God said let there be a cataract, and it was so. When the river has reached its new level, the precipice on either side shows a terrific chasm of solid rock; some beautiful plants are clinging to its sides, and oak, ash, and cedar, in many places, clothe their terrors with rich foliage.

1832
Trollope

This violent transition from level shores to a deep ravine, seems to indicate some great convulsion as its cause, and when I heard of a burning spring close by, I fancied the volcanic power still at work, and that the wonders of the region might yet increase.

We passed four delightful days of excitement and fatigue; we drenched ourselves in spray; we cut our feet on the rocks; we blistered our faces in the sun; we looked up the cataract and down the cataract; we perched ourselves on every pinnacle we could find; we dipped our fingers in the flood at a few yards' distance from its thundering fall; in short, we strove to fill as many niches of memory with Niagara as possible; and I think the images will be within the power of recall for ever.

We met many groups of tourists in our walks, chiefly American, but they were, or we fancied they were, but little observant of the wonders around them.

. . . . .

The company at the hotel changed almost every day. Many parties arrived in the morning, walked to the falls, returned to the hotel to dinner, and departed by the coach immediately after it. Many groups were indescribably whimsical, both in appearance and manner. Now and then a first-rate dandy shot in among us, like a falling star.

. . . . .

Fortunately for our enjoyment, the solemn character of the scene was but little broken in upon by these gentry. Every one who comes to Forsythe's hotel (except Mrs. Bogle Corbet), walks to the shantee, writes their name in a book which is kept there, and, for the most part, descends in a spiral staircase which leads from the little platform before it to the rock below. Here they find another shantee, but a few yards from the entrance of that wondrous cavern which is formed by the falling flood on one side, and by the mighty rock over which it pours, on the other. To this frail shelter from the wild uproar,

and the blinding spray, nearly all the touring gentlemen, and even many of the pretty ladies, find their way. But here I often saw their noble daring fail, and have watched them dripping and draggled turn again to the sheltering stairs, leaving us in full possession of the awful scene we so dearly loved to gaze upon. How utterly futile must every attempt be to describe the spot! How vain every effort to convey an idea of the sensations it produces! Why is it so exquisite a pleasure to stand for hours drenched in spray, stunned by the ceaseless roar, trembling from the concussion that shakes the very rock you cling to, and breathing painfully in the moist atmosphere that seems to have less of air than water in it? Yet pleasure it is, and I almost think the greatest I ever enjoyed. We more than once approached the entrance to this appalling cavern, but I never fairly entered it, though two or three of my party did. I lost my breath entirely; and the pain at my breast was so severe, that not all my curiosity could enable me to endure it.

1832 Trollope

What was that cavern of the winds, of which we heard of old, compared to this? A mightier spirit than Æolus reigns here.

Nor was this spot of dread and danger the only one in which we found ourselves alone. The path taken by "the company" to the shantee, which contained the "book of names" was always the same; this wound down the steep bank from the gate of the hotel garden, and was rendered tolerably easy by its repeated doublings; but it was by no means the best calculated to manage to advantage the pleasure of the stranger in his approach to the spot. All others, however, seemed left for us alone.

During our stay we saw the commencement of another staircase, intended to rival in attraction that at present in use; it is but a few yards from it, and can in no way, I think, contribute to the convenience of the descent. The erection of the central shaft of this spiral stair was a most tremendous operation, and made me sick and giddy as I watched it. After it

1832 Trollope

had been made fast at the bottom, the carpenters swung themselves off the rocks, by the means of ropes, to the beams which traversed it; and as they sat across them, in the midst of the spray and the uproar, I thought I had never seen life perilled so wantonly. But the work proceeded without accident, and was nearly finished before we left the hotel.

It was a sort of pang to take what we knew must be our last look at Niagara; but "we had to do it," as the Americans say, and left it on the 10th of June, for Buffalo.

1832 Vigne

VIGNE, GODFREY T. Six months in America. Lond.: Whittaker, Treacher. 1832. 2:123–134.

The author, an English barrister, viewed "the diapson of fresh waters," as he calls Niagara, in 1832. To him disappointment in the spectacle was "but a proof of insufferable affectation," but he thought that the effect of a Bengal light on the cataract "on a dark, stormy winter's night, would be exceedingly fine."

1833

1833 Arfwedson

ARFWEDSON, CARL DAVID. The United States and Canada in 1832, 1833, and 1834. Lond.: Richard Bentley. 1834. 2:312–326.

A good account by a careful observer.

1833 Cortambert

CORTAMBERT, LOUIS RICHARD. "Excursion aux cataractes du Niagara. Juin, 1833." (*In his* Voyage au pays des Osages. Un tour en Sicile. Paris: A. Bertrand. 1837. Pp. 85–90.)

1833 Henry

HENRY, WALTER. Events of a military life: being recollections after service in the Peninsular war, invasion of France, the East Indies, St. Helena, Canada, and elsewhere. Lond.: Pickering. 1843. 2:220–227.

An interesting account of the psychological effect of the Falls on a British military surgeon.

I have visited the Falls of Niagara four times; and on three of these occasions in company with ladies — for the view of anything grand or sublime in nature or art is not worth two pence in selfish solitude, or rude male companionship, unembellished by the sex, and I have noticed that the predominant

feeling at first is the inadequacy of language to express the strength of the emotion. One of the ladies alluded to, of a refined mind and ingenuous nature, after gazing for the first time, with a long and fixed expression, on the sublime object before her, looked for an instant in my face and burst into tears. There are others so constituted as to be fascinated by the spectacle to such a dangerous and overpowering extent, as to feel a strong desire to throw themselves into the abyss. A lady of good sense and mature age assured me, that as she stood on the edge of the Table Rock, this impulse became so strong and overmastering, that she was obliged to recede rapidly from the brink, for fear of the consequences. Here the mind must have been momentarily deranged by the awful grandeur of the scene. I am now of a calm and subdued temperament, the result of long effort and much reflection on the silliness of giving the rein to strong feelings and emotions. But when, on my first visit, I proceeded through the Pavilion garden towards the Table Rock, and beheld an ocean moving over the precipice, and flashing and gliding into the enormous milk-white pool below, without any apparent effort, and with all the ease of a quiet rivulet stealing through a meadow, all mental restraint gave way, and my inmost spirit burst out in loud and enthusiastic admiration. 1833 Henry

KEMBLE, FRANCES ANNE. Records of a girlhood. N. Y.: Holt. 1879. Pp. 579–585. 1833 Kemble

The account occurs in familiar letters written in July and August, 1833. "As for Niagara," says Mrs. Kemble, "words cannot describe it, nor can any imagination, I think, suggest even an approximate idea of its terrible loveliness. I feel half crazy whenever I think of it."

O'BRYAN, WILLIAM. A narrative of travels in the United States. . . . Lond.: Printed for the author. 1836. Pp. 192–196. 1833 O'Bryan

The narrative of a clergyman who visited the Falls in April, 1833. His account is accompanied by a queer picture of the Falls done by the author.

WILLIS, NATHANIEL PARKER. American scenery. Lond.: 1840. See index. 1833 Willis

1834

1834 Fields

FIELDS, ANNIE, *editor*. Life and letters of Harriet Beecher Stowe. Bost. and N. Y.: Houghton, Mifflin. (1897.) Pp. 89–90.

Impressions of a visit made in the summer of 1834. Says Mrs. Stowe:

Let me tell, if I can, what is unutterable. I did not once think whether it was high or low; whether it roared or didn't roar; whether it equaled my expectations or not. My mind whirled off, as it seemed to me, in a new, strange world. It seemed unearthly, like the strange, dim images in the Revelation. I thought of the great white throne; the rainbow around it; the throne in sight like unto an emerald; and oh! that beautiful water rising like moonlight, falling as the soul sinks when it dies, to rise refined, spiritualized, and pure; that rainbow, breaking out, trembling, fading, and again coming like a beautiful spirit walking the waters. Oh, it is lovelier than it is great; it is like the Mind that made it: great, but so veiled in beauty that we gaze without terror. I felt as if I could have *gone over* with the waters; it would be so beautiful a death; there would be no fear in it. I felt the rock tremble under me with a sort of joy. I was so maddened that I could have gone too, if it had gone.

1834 Hawthorne

HAWTHORNE, NATHANIEL. Fragments from the journal of a solitary man. (*In* Fanshawe, the Dolliver romance, and other pieces. Boston. Osgood. 1876. Pp. 93–96.)

HAWTHORNE, NATHANIEL. My visit to Niagara. (*In* Fanshawe, the Dolliver romance, and other pieces. Boston. Osgood. 1876. Pp. 105–114.)

Never did a pilgrim approach Niagara with deeper enthusiasm than mine. I had lingered away from it, and wandered to other scenes, because my treasury of anticipated enjoyments, comprising all the wonders of the world, had nothing else so magnificent, and I was loath to exchange the pleasures of hope for those of memory so soon. At length the day came. The stage-coach, with a Frenchman and myself on the back seat, had already left Lewiston, and in less than an hour would set

us down in Manchester. I began to listen for the roar of the cataract, and trembled with a sensation like dread, as the moment drew nigh, when its voice of ages must roll, for the first time, on my ear. The French gentleman stretched himself from the window, and expressed loud admiration, while, by a sudden impulse, I threw myself back and closed my eyes. When the scene shut in, I was glad to think, that for me the whole burst of Niagara was yet in futurity. We rolled on, and entered the village of Manchester, bordering on the falls. 1834 Hawthorne

I am quite ashamed of myself here. Not that I ran, like a madman to the falls, and plunged into the thickest of the spray, — never stopping to breathe, till breathing was impossible: not that I committed this, or any other suitable extravagance. On the contrary, I alighted with perfect decency and composure, gave my cloak to the black waiter, pointed out my baggage, and inquired, not the nearest way to the cataract, but about the dinner-hour. The interval was spent in arranging my dress. Within the last fifteen minutes, my mind had grown strangely benumbed, and my spirits apathetic, with a slight depression, not decided enough to be termed sadness. My enthusiasm was in a deathlike slumber. Without aspiring to immortality, as he did, I could have imitated that English traveler, who turned back from the point where he first heard the thunder of Niagara, after crossing the ocean to behold it. Many a Western trader, by the by, has performed a similar act of heroism with more heroic simplicity, deeming it no such wonderful feat to dine at the hotel and resume his route to Buffalo or Lewiston, while the cataract was roaring unseen.

Such has often been my apathy, when objects, long sought, and earnestly desired, were placed within my reach. After dinner — at which an unwonted and perverse epicurism detained me longer than usual — I lighted a cigar and paced the piazza, minutely attentive to the aspect and business of a very ordinary village. Finally, with reluctant step, and the feeling of an intruder, I walked towards Goat Island. At the toll-house,

1834
Hawthorne

there were further excuses for delaying the inevitable moment. My signature was required in a huge ledger, containing similar records innumerable, many of which I read. The skin of a great sturgeon, and other fishes, beasts, and reptiles; a collection of minerals, such as lie in heaps near the falls; some Indian moccasins, and other trifles, made of deer-skin and embroidered with beads; several newspapers from Montreal, New York, and Boston,— all attracted me in turn. Out of a number of twisted sticks, the manufacture of a Tuscarora Indian, I selected one of curled maple, curiously convoluted, and adorned with the carved images of a snake and a fish. Using this as my pilgrim's staff, I crossed the bridge. Above and below me were the rapids, a river of impetuous snow, with here and there a dark rock amid its whiteness, resisting all the physical fury, as any cold spirit did the moral influences of the scene. On reaching Goat Island, which separates the two great segments of the falls, I chose the right-hand path, and followed it to the edge of the American cascade. There, while the falling sheet was yet invisible, I saw the vapor that never vanishes, and the Eternal Rainbow of Niagara.

It was an afternoon of glorious sunshine, without a cloud, save those of the cataracts. I gained an insulated rock, and beheld a broad sheet of brilliant and unbroken foam, not shooting in a curved line from the top of the precipice, but falling headlong down from height to depth. A narrow stream diverged from the main branch, and hurried over the crag by a channel of its own, leaving a little pine-clad island and a streak of precipice between itself and the larger sheet. Below arose the mist, on which was painted a dazzling sunbow with two concentric shadows,— one, almost as perfect as the original brightness; and the other, drawn faintly round the broken edge of the cloud.

Still I had not half seen Niagara. Following the verge of the island, the path lead me to the Horseshoe, where the real, broad St. Lawrence, rushing along on a level with its banks, pours its

whole breadth over a concave line of precipice, and thence pursues its course between lofty crags towards Ontario. A sort of bridge, two or three feet wide, stretches out along the edge of the descending sheet, and hangs upon the rising mist, as if that were the foundation of the frail structure. Here I stationed myself in the blast of wind, which the rushing river bore along with it. The bridge was tremulous beneath me, and marked the tremor of the solid earth. I looked along the whitening rapids, and endeavored to distinguish a mass of water far above the falls, to follow it to their verge, and go down with it, in fancy, to the abyss of clouds and storm. Casting my eyes across the river, and every side, I took in the whole scene at a glance, and tried to comprehend it in one vast idea. After an hour spent thus, I left the bridge, and, by a staircase, winding almost interminably round a post, descended to the base of the precipice. From that point, my path lay over slippery stones, and among great fragments of the cliff, to the edge of the cataract, where the wind at once enveloped me in spray, and perhaps dashed the rainbow round me. Were my long desires fulfilled? And had I seen Niagara?

1834
Hawthorne

Oh that I had never heard of Niagara till I beheld it! Blessed were the wanderers of old, who heard its deep roar, sounding through the woods, as the summons to an unknown wonder, and approached its awful brink, in all the freshness of native feeling. Had its own mysterious voice been the first to warn me of its existence, then, indeed, I might have knelt down and worshipped. But I had come thither, haunted with a vision of foam and fury, and dizzy cliffs, and an ocean tumbling down out of the sky,— a scene, in short, which nature had too much good taste and calm simplicity to realize. My mind had struggled to adapt these false conceptions to the reality, and finding the effort vain, a wretched sense of disappointment weighed me down. I climbed the precipice, and threw myself on the earth, feeling that I was unworthy to look at the Great Falls, and careless about beholding them again. . . .

1834
Hawthorne

All that night, as there has been and will be for ages past and to come, a rushing sound was heard, as if a great tempest were sweeping through the air. It mingled with my dreams, and made them full of storm and whirlwind. Whenever I awoke, and heard this dread sound in the air, and the windows rattling as with a mighty blast, I could not rest again, till looking forth, I saw how bright the stars were, and that every leaf in the garden was motionless. Never was a summer night more calm to the eye, nor a gale of autumn louder to the ear. The rushing sound proceeds from the rapids, and the rattling of the casements is but an effect of the vibration of the whole house, shaken by the jar of the cataract. The noise of the rapids draws the attention from the true voice of Niagara, which is a dull, muffled thunder, resounding between the cliffs. I spent a wakeful hour at midnight, in distinguishing its reverberations, and rejoiced to find that my former awe and enthusiasm were reviving.

Gradually, and after much contemplation, I came to know, by my own feelings, that Niagara is indeed a wonder of the world, and not the less wonderful, because time and thought must be employed in comprehending it. Casting aside all preconceived notions, and preparations to be dire-struck or delighted, the beholder must stand beside it in the simplicity of his heart, suffering the mighty scene to work its own impression. Night after night, I dreamed of it, and was gladdened every morning by the consciousness of a growing capacity to enjoy it. Yet I will not pretend to the all-absorbing enthusiasm of some more fortunate spectators, nor deny that very trifling causes would draw my eyes and thoughts from the cataract.

The last day that I was to spend at Niagara, before my departure for the Far West, I sat upon the Table Rock. This celebrated station did not now, as of old, project fifty feet beyond the line of the precipice, but was shattered by the fall of an immense fragment, which lay distant on the shore below. Still, on the utmost verge of the rock, with my feet hanging over it, I felt as if suspended in the open air. Never before

had my mind been in such perfect unison with the scene. There were intervals, when I was conscious of nothing but the great river, rolling calmly into the abyss, rather descending than precipitating itself, and acquiring tenfold majesty from its unhurried motion. It came like the march of Destiny. It was not taken by surprise, but seemed to have anticipated, in all its course through the broad lakes, that it must pour their collected waters down this height. The perfect foam of the river, after its descent, and the ever-varying shapes of mist, rising up, to become clouds in the sky, would be the very picture of confusion, were it merely transient, like the rage of a tempest. But when the beholder has stood awhile, and perceives no lull in the storm, and considers that the vapor and the foam are as everlasting as the rocks which produce them, all this turmoil assumes a sort of calmness. It soothes, while it awes the mind. 1834 Hawthorne

Leaning over the cliff, I saw the guide conducting two adventurers behind the falls. It was pleasant, from that high seat in the sunshine, to observe them struggling against the eternal storm of the lower regions, with heads bent down, now faltering, now pressing forward, and finally swallowed up in their victory. After their disappearance, a blast rushed out with an old hat, which it had swept from one of their heads. The rock, to which they were directing their unseen course, is marked, at a fearful distance on the exterior of the sheet, by a jet of foam. The attempt to reach it appears both poetical and perilous to a looker-on, but may be accomplished without much more difficulty or hazard, than in stemming a violent north-easter. In a few moments, forth came the children of the mist. Dripping and breathless, they crept along the base of the cliff, ascended to the guide's cottage, and received, I presume, a certificate of their achievement, with three verses of sublime poetry on the back.

My contemplations were often interrupted by strangers who came down from Forsyth's to take their first view of the falls. A short, ruddy, middle-aged gentleman, fresh from Old England,

1834
Hawthorne

peeped over the rock, and evinced his approbation by a broad grin. His spouse, a very robust lady, afforded a sweet example of maternal solicitude, being so intent on the safety of her little boy that she did not even glance at Niagara. As for the child, he gave himself wholly to the enjoyment of a stick of candy. Another traveler, a native American, and no rare character among us, produced a volume of Captain Hall's tour, and labored earnestly to adjust Niagara to the captain's description, departing, at last, without one new idea or sensation of his own. The next comer was provided, not with a printed book, but with a blank sheet of foolscap, from top to bottom of which, by means of an ever-pointed pencil, the cataract was made to thunder. In a little talk, which we had together, he awarded his approbation to the general view, but censured the position of Goat Island, observing that it should have been thrown farther to the right, so as to widen the American falls, and contract those of the Horseshoe. Next appeared two traders of Michigan, who declared, that, upon the whole, the sight was worth looking at; there certainly was an immense water-power here; but that, after all, they would go twice as far to see the noble stone-works of Lockport, where the Grand Canal is locked down a descent of sixty feet. They were succeeded by a young fellow, in a homespun cotton dress, with a staff in his hand, and a pack over his shoulders. He advanced close to the edge of the rock, where his attention, at first wavering among the different components of the scene, finally became fixed in the angle of the Horseshoe falls, which is, indeed, the central point of interest. His whole soul seemed to go forth and be transported thither, till the staff slipped from his relaxed grasp, and falling down — down — down — struck upon the fragment of the Table Rock.

In this manner I spent some hours, watching the varied impression, made by the cataract, on those who disturbed me, and returning to unwearied contemplation, when left alone. At length my time came to depart. There is a grassy footpath, through the woods, along the summit of the bank, to a point

whence a causeway, hewn in the side of the precipice, goes winding down to the Ferry, about half a mile below the Table Rock. The sun was near setting, when I emerged from the shadow of the trees, and began the descent. The indirectness of my downward road continually changed the point of view, and showed me, in rich and repeated succession, now, the whitening rapids and majestic leap of the main river, which appeared more deeply massive as the light departed; now, the lovelier picture, yet still sublime, of Goat Island, with its rocks and grove, and the lesser falls, tumbling over the right bank of the St. Lawrence, like a tributary stream; now, the long vista of the river, as it eddied and whirled between the cliffs, to pass through Ontario toward the sea, and everywhere to be wondered at, for this one unrivalled scene. The golden sunshine tinged the sheet of the American cascade, and painted on its heaving spray the broken semicircle of a rainbow, heaven's own beauty crowning earth's sublimity. My steps were slow, and I paused long at every turn of the descent, as one lingers and pauses who discerns a brighter and brightening excellence in what he must soon behold no more. The solitude of the old wilderness now reigned over the whole vicinity of the falls. My enjoyment became the more rapturous, because no poet shared it, nor wretch devoid of poetry profaned it; but the spot so famous through the world was all my own!

1834 Hawthorne

MARTINEAU, HARRIET. Retrospect of western travel. Lond.: Saunders and Otley. 1838. 1:96–109.

1834 Martineau

It is not my intention to describe what we saw at Niagara so much as to relate what we did. To offer an idea of Niagara by writing of hues and dimensions is much like representing the kingdom of Heaven by images of jasper and topazes.

I visited the Falls twice: first in October, 1834, in company with the party with whom we traversed the state of New-York, when we stayed nearly a week; and again with Dr. and Mrs. F., and other friends, in June, 1836, when we remained between

1834
Martineau

two and three days. The first time we approached the falls from Buffalo, the next, from Lewistown and Queenstown.

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We stepped into the stage at Buffalo at half past eight in the morning on the 14th of October. At Black Rock we got out to cross the ferry. We looked at the green rushing waters we were crossing, and wondered whether they or we should be at the falls first. We had to wait some minutes for the stage on the Canada side, and a comely English woman invited us into her kitchen to warm ourselves.

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The road is extremely bad all the way from the ferry to the falls, and the bridges the rudest of the rude. The few farms looked decaying, and ill-clad children offered us autumn fruit for sale. We saw nothing to flatter our national complacency; for truly the contrast with the other side of the river was mournful enough. It was not until we had passed the inn with the sign of the "Chippaway Battle Ground" that we saw the spray from the falls. I believe we might have seen it sooner if we had known where to look. "Is that it?" we all exclaimed. It appeared on the left-hand side, whereas we had been looking to the right; and instead of its being suspended in the air like a white cloud, as we had imagined, it curled vigorously up, like smoke from a cannon or from a replenished fire. The winding of the road presently brought this round to our right hand. It seemed very near: the river, too, was as smooth as oil. The beginning of the Welland canal was next pointed out to me, but it was not a moment to care for canals. Then the little Round Island, covered with wood and surrounded by rapids, lay close at hand, and a recess of the Canada shore. Some of the rapids, of eight or ten feet descent, would be called falls elsewhere. They were glittering and foamy, with spaces of green water between. I caught a glimpse of a section of the cataract, but not any adequate view, before we were driven briskly up to the door of the hotel. We ran quickly from piazza to piazza

till we reached the crown of the roof, where there is a space railed in for the advantage of the gazer who desires to reach the highest point. I think the emotion of this moment was never renewed or equalled. The morning had been cloudy, with a very few wandering gleams. It was now a little after noon; the sky was clearing, and at this moment the sun lighted up the Horseshoe Fall. I am not going to describe it. The most striking appearance was the slowness with which the shaded green waters rolled over the brink. This majestic oozing gives a true idea of the volume of the floods, but they no longer look like water. 1834 Martineau

We wandered through the wood, along Table Rock, and to the ferry. We sat down opposite to the American Falls, finding them the first day of two more level to our comprehension than the Great Horseshoe Cataract: yet throughout, the beauty was far more impressive to me than the grandeur. One's imagination may heap up almost any degree of grandeur; but the subtile colouring of this scene, varying with every breath of wind, refining upon the softness of driven snow, and dimming all the gems of the mine, is wholly inconceivable. The woods on Goat Island were in their gaudiest autumn dress; yet, on looking up to them from the fall, they seemed one dust colour. This will not be believed, but it is true.

The little detached fall on the American side piqued my interest at once. It looks solitary in the midst of the crowd of waters, coming out of its privacy in the wood to take its leap by itself. In the afternoon, as I was standing on Table Rock, a rainbow started out from the precipice a hundred feet below me, and curved upward as if about to alight on my head. Other such apparitions seemed to have a similar understanding with the sun. They went and came, blushed and faded, the floods rolling on, on, till the human heart, overcharged with beauty, could bear no more.

We crossed the ferry in the afternoon. Our boat was tossed like a cork in the writhing waves. We soon found that, though driven hither and thither by the currents, the ferryman always

1834
Martineau

conquers at last, and shoots his boat into the desired creek; but the tossing and whirling amid the driving spray seems a rather dubious affair at first. To be carried down would be no better than to be sucked up the river, as there is a fatal whirlpool below which forbids all navigation as peremptorily as the falls.

I still think the finest single impression of all is half way up the American Fall, seen, not from the staircase, but from the bank on the very verge of the sheet. Here we stood this first evening, and amid the rapids above. In returning, we saw from the river the singular effect of the clouds of spray being in shadow, and the descending floods in light; while the evening star hung over one extremity of the falls, and the moon over the other, and the little perpetual cloud, amber in the last rays from the west, spread its fine drizzle like a silver veil over the scene.

There is nothing like patient waiting in a place like this. The gazer, who sits for hours watching what sun and wind may be pleased to reveal, is sure to be rewarded, somewhat as Newton described himself as being when he set a thought before him, and sat still to see what would come out of it. It is surprising what secrets of the thunder cavern were disclosed to me during a few days of still watching; disclosed by a puff of wind clearing the spray for an instant, or by the lightest touch of a sunbeam. The sound of the waters is lulling, even on the very brink; but if one wishes for stillness, there is the forest all around, where the eyes may become accustomed to common objects again. It is pleasant, after the high excitement, to stroll in the wild woods, and wonder what this new tree is and what that; and to gossip with the pigs, slim and spruce while fed on forest nuts and roots; and to watch the progress of a loghouse, sitting the while on a stump or leaning over a snake-fence; and then to return, with new wonder, to the ethereal vision.

. . . . .

One morning we found an old man, between seventy and eighty years old, gazing from Table Rock. He was an American. Being on a journey, he had walked from Queenstown to see the falls. He quietly observed that he was ashamed to

think that there had been wars near such a place, and that he hoped the English and Americans were grown wiser now, and would not think of fighting any more. This came in echo of my thought. I had been secretly wishing that all the enemies in the world could be brought together on this rock: they could not but love as brethren. 1834 Martineau

. . . . .

The second time I visited Niagara I accomplished the feat of going behind the fall. In October it was too cold; on a sunny 8th of June there was no imprudence in it. . . . We ascended to the guide's house, and surveyed the extraordinary costume in which we were to make the expedition. Stout socks and shoes (but I would recommend ladies to go shod as usual), thick cotton garments reaching to the feet, green oilskin jackets and hats; in this mountaineer sort of costume is the adventure to be gone through.

. . . . .

We had a stout negro for a guide. He took me by the hand, and led me through the spray. I presently found the method of keeping myself at my ease. It was to hold down the brim of my hat, so as to protect my eyes from the dashing water, and to keep my mouth shut. With these precautions I could breathe and see freely in the midst of a tumult which would otherwise be enough to extinguish one's being. A hurricane blows up from the caldron; a deluge drives at you from all parts; and the noise of both wind and waters, reverberated from the cavern, is inconceivable. Our path was sometimes a wet ledge of rock just broad enough to allow one person at a time to creep along; in other places we walked over heaps of fragments both slippery and unstable. If all had been dry and quiet, I might probably have thought this path above the boiling basin dangerous, and have trembled to pass it; and amid the hubbub of gusts and floods, it appeared so firm a footing that I had no fear of slipping into the caldron. From the moment that I perceived that we were actually behind the cataract, and not in a mere cloud of spray, the enjoyment was intense. I not only saw the watery

1834
Martineau

curtain before me like tempest-driven snow, but by momentary glances could see the crystal roof of this most wonderful of Nature's palaces. The precise point where the flood left the rock was marked by a gush of silvery light, which, of course, was brighter where the waters were shooting forward than below where they fell perpendicularly. There was light enough to see one another's features by, and even to give a shadow to the side of the projecting rock which barred our farther progress. When we came within a few paces of this projection, our guide, by a motion of his hand (for speaking was out of the question), forbade my advancing farther. But it was no time and place to be stopped by anything but impossibilities. I saw that though there was no regular path on the other side of the guide, there were two pieces of rock wide enough for my feet, by standing on which I might touch the wall which limited our walk. I made the guide press himself back against the rock, and crossed between him and the caldron, and easily gained my object — laying my hand on Termination Rock. When I returned to my place Dr. F. passed both the guide and myself for the same purpose. In returning my hat blew off, in spite of all my efforts to hold it on. The guide put his upon my head, and that was carried away in like manner. I ought to have been instructed to tie it well on, for mere holding will not do in a hurricane. It is a proof that we were well lighted in our cavern, that we all saw the outline of a hat which was jammed between two stones some way beneath us. The guide made for this, looking just as if he were coolly walking down into destruction; for the volumes of spray curled thickly up, as if eager to swallow him. He grasped the hat, but found it too much beaten to pieces to be of any use.

Mrs. F. says we looked like three gliding ghosts when her anxious eye first caught our forms moving behind the cloud. She was glad enough to see us; for some one passing by had made her expect us at least two minutes before we appeared. Dripping at all points as we were, we scudded under the rocks

and up the staircase to our dressing-rooms, after which we wrote our names among those of the adventurers who have performed the same exploit, and received a certificate of our having visited Termination Rock. I was told that a fee and a wetting in the spray may secure such a certificate at any time. Be this as it may, ours were honest. 1834 Martineau

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We clambered down to the water's edge, where men were gathering spars and other "curiosities." We sat long amusing ourselves with watching the vain attempts of the tree-trunks, which had been carried over from above, to get any farther down the river. They were whisked about like twigs in the boiling waters, and sometimes made a vigorous shoot as if to get free of the eddies; but as often as they reached a particular spot they were sure to be turned back, and sucked up the stream to try again. I think they must be doing penance there still, unless, enormous logs as they are, they have been dashed to pieces.

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At some unknown hour of a bright morning, therefore, we set forth from our hotel, and in due time reached the ferry. The entire party paid sufficient attention to business to sit properly in the boat, which is no place for freak and frolic while bobbing about among the eddies. We *dawdled* long about the American Fall. I had never before been fully aware of its power over the senses. To-day I saw a lady who was sitting on the bank — as safe a seat as an armchair by the fireside — convulsively turn away from the scene and clasp the ground. Yet the water flows so tranquilly that I should not be afraid to stand in the flood near the bank where it takes the leap. I tried the force of the water there, and found it very moderate.

. . . . .

We dawdled hours away in Goat Island; now lying on the grassy bank with our feet almost into the rapids; now fanning ourselves in the translucent green shades of the wood, among

1834
Martineau

rabbits and goats, and then gathering new wild-flowers from the multitude which blossomed under our feet, the roar of the falls solemnizing all. The timid ones sat in the alcove erected above the Horseshoe Fall, while the rest went down to the Terrapin Bridge and Tower. The tower, forty feet high, is built on rocks in the midst of the rapids, and its summit affords an absolutely complete view of the scene. The bridge is built on logs which extend from rock to rock in the rapids to the edge of the precipice, the flood gushing beneath in a dizzying whirl. At my first visit this bridge had been complete, and, to all appearance, secure. I had stood on its extreme point, which projected over the precipice. There I hung suspended above the fall, standing in the air on the extremity of a beam, and without any suspicion that I was not perfectly safe. It was there that I learned some of the secrets of the cataract. I saw there what can be seen nowhere else, the emerald columns broken and forced up, and falling again in gushes of diamonds, which again were melted into wreaths of dazzling snow. It was now too late to see this any more. The bridge had broken down some way from the end; the handrail was gone; and the brink of the precipice was no longer accessible. We got to the tower, however, and farther; and Charley and his father stepped down from the bridge among the rocks, and stood amid the water very near the brink of the great fall! Their position was shown to be perfectly safe by the verdure of these rocks. Slight shrubs, rooted in their crevices, were full of leaf. Their smallest twigs were tossed in the never-dying breeze without being snapped. Yet we were glad when our friends were safe on the bridge again.

We descended the Biddle staircase — the spiral staircase fixed against the perpendicular rock in Goat Island — and pursued a narrow path from its foot back to the fall, where we found a glacier! An enormous pile of snow and ice lay against the rock, so solid, under this intense June sun, that Charley climbed to the top of it. Here every successive pulse of the cataract was like a cannon shot a few yards off, so that there was no standing

it long; there was much yet to do; and the party probably observed, though no one chose to mention it, that the sun was going down. We crossed the detached American Fall by its rustic bridge, and hunted it back to its retreat in the wood. Our faces were now turned homeward; but we lingered long in the shades, and afterward at Bath Island, where some one observed that it would be dusk before we could reach the ferry, and that the walk home on the Canada side was not of a kind to be prosecuted in the dark. The sun disappeared before we reached the ferry-house, and the panorama from the river was seen in the magnitude and majesty of twilight. In the dark woods on the Canada side we made ourselves visible to each other by catching fireflies and sticking them in our bonnets. They sat very still among our bows of riband, and really served our purpose very well. 1834 Martineau

This excellent account speaks for itself.

ZAVALA, LORENZO DE. Viage á los Estados-Unidos del Norte de América. Paris; de Decourchant. 1834. Pp. 97–98. 1834 Zavala

The author was one of the earliest Spanish tourists to write of the Falls. He gives a brief description of the scenery and the emotions which the sight inspired.

WIED-NEUWIED, MAXIMILIAN ALEXANDER PHILIPP, *Prinz*, VON. Reise in das innere Nord-America in den Yahren 1832 bis 1834. Coblenz: 1839. Bei J. Hoelscher. Vol. II. Pp. 398–405. 1834 Wied-Neuwi

This Prussian was a traveller and naturalist who reached the rank of major general in the Prussian army, but after 1815 devoted himself to science. He travelled extensively in Brazil and North America. A quotation from the English translation of his American travels will be found in chapter VI.

WIED-NEUWIED, MAXIMILIAN ALEXANDER PHILIPP, *Prinz*, VON. Voyage dans l'interieur de l'Amérique du Nord, exécuté pendant les anneés 1832, 1833 et 1834, par le prince Maximilien de Neuwied. Ouvrage accompagné d'un atlas de 80 planches environ, format demi-colombier, dessinées sur les lieux par M. Charles Bodmer. . . . Paris: A. Bertrand. 1840–43. Vol. III. Pp. 200–209.

1835

1835 Cox

Cox, F. A. *and* Hoby, J. The Baptists in America; a narrative of the deputation from the Baptist Union in England, to the United States and Canada. N. Y.: Leavitt, Lord. 1836. Pp. 207–209.

According to Dr. Cox, "It is an epoch in existence to have seen Niagara."

1835 Fleming

Fleming, William. Four days at Niagara Falls, in North America. Manchester: Love and Barton. 1840.

A sympathetic and detailed record of a visit made in the summer of 1835. The author was interested in the scientific aspects of the region as well as in the scenery. He was evidently much impressed, for he says: "The emotion produced in me by the sight and sound of these Falls has exceeded any I ever before received from natural objects, excepting perhaps that derived from a glance into the crater of Aetna."

1835 Gosselman

Gosselman, Karl August. Resa i Norra Amerika. Itvenne Delar Nyköping: (P. E. Winge.) 1835. Förra Delen. Pp. 174–224.

1835 Morley

Morley, John. Life of Richard Cobden. Lond.: Chapman and Hall. 1882. Pp. 6–7.

According to Morley, "Of the great glory of the American continent, Cobden thought as rapturously as any boaster in the land." How high Cobden's estimate was will appear from the following story also related by Morley: "Once in after years, a friend who was about to visit the United States, asked him (Cobden) whether it would be worth while to go far out of his way for the sake of seeing the Falls of Niagara. 'Yes, most assuredly,' was Cobden's reply. 'There are two sublimities in nature — one of rest, the other of motion. The sublimity of rest is a distant view of the Alps; the sublimity of motion is Niagara.'"

1835 Sagra

Sagra, Ramon de la. Cinco meses en los Estados-Unidos de la America del Norte desde el 20 de Abril al 23 de Setiembre de 1835. Diario de viaje. Paris: Pablo Renourd. 1836. Pp. 255–267.

The author, the director of the Botanical Garden at Havana, writes of the feelings and reflections inspired by the Falls rather than of the Falls themselves. He was at the Falls during July and August.

1835 Spencer

Spencer, Caroline. Journal — A trip to Niagara in 1835. (Mag. Am. hist., Oct. 1889. 22:231–242.)

A sprightly and interesting account of a trip in July, 1835.

1836

BUETTNER, JOHANN G. Briefe aus und über Nordamerika; oder, Beiträge zu einer richtigen kenntniss der Vereinigten Staaten und ihrer bewohner. . . . Dresden and Leipzig: Arnoldische Buchhandlung. 1847. 1:61–69. 1836 Buettner

CLARK, LEWIS GAYLORD, *editor*. The literary remains of the late Willis Gaylord Clark, including the Ollapodiana Papers, the Spirit of Life, and a selection from his various prose and poetical writings. N. Y.: Burgess, Stringer and Co. 1844. Pp. 154–172. 1836 Clark

An original account of the Falls in intimate and conversational style, by one who believed that Niagara could be described and was willing to try it.

EYRE, JOHN. The beauties of America. Buffalo: Steele. 1836. Pp. 59–65. 1836 Eyre

GILMAN, CAROLINE. The poetry of travelling in the United States. With additional sketches, by a few friends; and A week among autographs, by Rev. S. Gilman. N. Y.: S. Colman. 1838. Pp. 106–116. 1836 Gilman

An interesting recital of personal experiences at the Falls.

. . . My room overlooks the Falls; I have listened to their roar, I have sprung often to the windows to see the white foam glitter, and rise and die away upwards, like thoughts that blend with heaven, and I have felt a spell on my soul as if Deity stood visibly there.

At the first approach to the Falls, from the smooth river to the Rapids I experienced a sensation of oppression, followed by trembling and fears; my first full view was at Table Rock, in sunshine. For a few moments I longed for the sombre cliffs of Trenton to relieve the dazzling whiteness of the foam; but as I gazed, my thoughts became dream-like; the far distant and dim future blended together; I felt an indistinct and troubled joy, like the bright chaos beneath me.

. . . . .

After a long, long view at Table Rock, where the waters of lakes and rivers are seen, concentrated, rushing over, and thundering down the chasm, we descended the staircase, and looked

1836
Gilman

upward. In these two views, from above and below, one has an idea of the power of the cataract. . . .

Two of us only remained at Table Rock at twilight. There was a fearful beauty in the growing darkness and loneliness of the scene. I lay down on the rock, with my head over the vast abyss. It was an hour of deep and mighty feelings — none but moral struggles can rival them in my soul. It is now midnight; the roar of the waters agitates me. I have just raised the window, and the white foam looks like a troubled spirit in the darkness. I cannot soothe down my heart — it is kindled by deep workings of the Invisible.

CATARACT HOUSE — *American side.*

My dreams are very wild here. I am not calm. A great voice seems calling on me, which I am too feeble to answer.

I left the Falls, for a few hours, with regret, as a matter of duty, to visit Brock's Monument. . . . The English houses on the way are neat, and somewhat tasteful. More pains are taken by the inhabitants than by persons in a corresponding class on the other side of the river, to hide the unseemly, and cultivate the agreeable. At Bridgewater, or Lundy's Lane, we stopped to see the battle ground of July 25th, 1814. . . . If men must fight, there can be no fitter place than in the neighborhood of Niagara. Strength to do and dare may well be caught from this spectacle. I think I could pull a woman's cap to tatters, who should offend me there.

. . . . . .

. . . It was a wild, cloudy day, and the scene seemed closely bounded. It is impossible, in the necessary direction given to the boat to stem the current, not to believe, as it leaps over the rapids, that it is hurrying to the foot of the Falls. The rushing of the cataract, and its roar, which has seemed to me increasing rather than diminishing ever since I came, are brought fearfully near. I closed my eyes an instant, as we approached the Fall, but one cannot afford to lose such moments, I opened

them, and gazed, and that view is impressed on my memory forever. We turned the seemingly dangerous point. I felt like a triumphant rider on a battle-field, and as our boat sprang forward, and I looked upward to the mass of waters, they seemed like giant witnesses. 1836 Gilman

And now I am in the United States again. It is in vain for me to attempt to describe the beauty and glory of this spectacle. I can only tell its effects on me individually. We paused at the foot of the staircase, near the descent of the lesser Fall. My agitation rather increases than diminishes in contemplating them. I have felt, ever since I came, as if the Great Architect were near. I care for nothing but this work of his hand. Human beings, whom I so love and prize, move by me like visions.

We are at the Cataract House, and as agreeably accommodated as persons can be who see the beautiful and sublime giving place to the useful and the low. This site is ruined. It is the prayer of all persons of taste that Goat or Iris Island may be preserved from this desecration. If any building is erected, it should have a classical exterior, with no more clearing than necessity demands, and be devoted to visitors, giving them a short and romantic walk to these glorious exhibitions. I was glad to escape from the sound of the hammer and mill. We registered our names at Bath Island, and paid our little fee. The rapids at the bridge are indescribably beautiful, and have shed over me, I think, as great an amount of delight as any other view. I never pass them without lingering with a protracted gaze, and feeling the growth of thought at every survey; then succeeds the secluded forest isle, in its perfect natural beauty, affording the eye time to repose, before it is again called to bow before the majesty of the Cataract. If there was nothing to be seen on the island but the view at Lunar Bridge, it would repay nature's pilgrim, who comes to worship here. Standing near the current of the lesser Fall, a rainbow appears at either side,—distinct arches of light, reposing on the mist like crowns of glory. We descended the Biddle staircase, and passed some hours on

1836
Gilman

the rocks at the foot of the Great Fall. Here its height and power are fully appreciated. The sun burst forth in radiance, and the sheeted foam glittered like frosted showers in his rays. How hard it is to leave that spot — one lingers, and lingers as over a new-found joy!

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The tower is boldly placed over the rushing flood, and is forty-five feet high; the access is by a bridge, which projects ten feet beyond the Falls. This view is the crown and glory of the whole. I felt the moral influence of the scene acting on my spiritual nature, and while lingering at the summit alone, offered a simple and humble prayer. Descending the Tower, I crossed to the extreme end of Terrapin Bridge; there, lying down with my head over the Fall, I ceased to pray or even to think. I gave myself up to the overpowering greatness of the scene, and my soul was still.

My mind has been calmed by rambling through the romantic forest walks of the island, where beautiful, but not overwhelming, views of the rapids and falls break through the clustering trees. Yielding myself up to the sensation of a new youth, I lost, for a while, the excitement of more thrilling scenery, and passed several hours in that delicious stroll, while the calm clear sky looked through the branches, and the shade of the woods softened the summer sun, soothing the over-taxed senses. Long — forever, may this gem of nature, Iris Island, remain in its wild beauty.

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My last look at the great Falls was at the lunar bow, at the extremity of Terrapin Bridge. If I was affected at the Gennessee Falls, with the thought of the tender associations which spring up at seeing this mighty element softened by its peaceful arch, how much did the spiritual beauty of this moonlight creation touch me in a scene of such surpassing power! The lunar bow lies in its shaded white on the mist, like a thing of the imagination, lending grace and softness to its majesty. When I had

beheld this spot in sunshine, I was overpowered; now a deep tide of reflection solemnized and absorbed me. One feels thoroughly *alone*, while overhanging that thundering mass of waters, with the silent moon treading her tranquil way. I thought of *soul*, and this mighty Fall seemed as a drop compared to the cataract of mind, which has been rushing from the bosom of the Eternal, from age to age, through every channel of human nature, now covered with mists, now glittering in sunshine, now softened by moonlight, now leaping in darkness and uncertainty, and I trust in God, destined to flow in many a happy river around his throne. 1836 Gilman

HEAD, *Sir* FRANCIS BOND. The emigrant. 5th ed. Lond.: John Murray. 1847. Pp. 205–218. 1836 Head

A description of the Falls on a winter night; on a winter day; an account of military activity on the banks of the Niagara in 1837; a British view of the incident of the *Caroline*.

MURRAY, CHARLES AUGUSTUS. Travels in North America during the years 1834, 1835, and 1836. Including a summer residence with the Pawnee tribe of Indians in the remote prairies of the Missouri, and a visit to Cuba and the Azore Islands. Lond.: Richard Bentley. 1839. 1:81–87. 1836 Murray

The author reflects on the majesty of the scene and the inadequacy of language to describe it.

Scener i Nord-Amerika ur en Svensk Resndes Minnes-Bok. Stockholm: Hos L. J. Hjerta. 1836. Pp. 163–190. 1836

The story of Francis Abbott, the hermit of Niagara.

WILLIS, NATHANIEL PARKER. Inklings of adventure. N. Y.: Saunders and Otley. 1836. 1:25–36. 1836 Willis

The sketch in question is one of a series of papers on Niagara, Lake Ontario, and the St. Lawrence. It appears in various others of Willis's works. It is an account of a trip made by Willis and a companion during the summer vacation. The events of the journey and the author's impressions of the scenery are intertwined with a love story and enlivened by whimsical dialogue and a thrilling tale of the rescue of a beautiful young woman by the author's companion.

1836
Jameson

JAMESON, *Mrs.* A. B. M. Winter studies and summer rambles in Canada. Lond.: Saunders & Otley. 1838. 1:82–94; 2:48–78; N. Y.: Wiley & Putnam. 1839. 1:60–71; 243–265.

Two important chapters on Niagara in winter and summer respectively.

January 29.

Well! I have seen these cataracts of Niagara, which have thundered in my mind's ear ever since I can remember — which have been my "childhood's thought, my youth's desire," since first my imagination was awakened to wonder and to wish. I have beheld them, and shall I whisper it to you?— but, O tell it not among the Philistines! — I wish I had not! I wish they were still a thing unbeheld — a thing to be imagined, hoped, and anticipated — something to live for:— the reality has displaced from my mind an illusion far more magnificent than itself — I have no words for my utter disappointment: yet I have not the presumption to suppose that all I have heard and read of Niagara is false or exaggerated — that every expression of astonishment, enthusiasm, rapture, is affectation or hyperbole. No! it must be my own fault. Terni, and some of the Swiss cataracts leaping from their mountains, have affected me a thousand times more than all the immensity of Niagara. O I could beat myself! and now there is no help!— the first moment, the first impression is over — is lost; though I should live a thousand years, long as Niagara itself shall roll, I can never see it again for the first time. Something is gone that cannot be restored. What has come over my soul and senses?— I am no longer Anna — I am metamorphosed — I am translated — I am an ass's head, a clod, a wooden spoon, a fat weed growing on Lethe's bank, a stock, a stone, a petrification — for have I not seen Niagara, the wonder of wonders; and felt — no words can tell *what* disappointment!

But, to take things in order: we set off for the Falls yesterday morning, with the intention of spending the day there, sleeping, and returning the next day to Niagara. The distance is fourteen miles, by a road winding along the banks of the Niagara river,

Early Print of Niagara, 1783

Drawn by Metz; engraved by James Heath

and over the Queenston heights; and beautiful must this land be in summer, since even now it is beautiful. The flower garden, the trim shrubbery, the lawn, the meadow with its hedgerows, when frozen up and wrapt in snow, always give me the idea of something not only desolate but dead; Nature is the ghost of herself, and trails a spectral pall; I always feel a kind of pity — a touch of melancholy — when at this season I have wandered among withered shrubs and buried flower-beds; but here, in the wilderness, where Nature is wholly independent of art, she does not die, nor yet mourn; she lies down to rest on the bosom of Winter, and the aged one folds her in his robe of ermine and jewels, and rocks her with his hurricanes, and hushes her to sleep. How still it was! how calm, how vast the glittering white waste and the dark purple forests! The sun shone out, and the sky was without a cloud; yet we saw few people, and for many miles the hissing of our sleigh, as we flew along upon our dazzling path, and the tinkling of the sleigh-bells, were the only sounds we heard. When we were within four or five miles of the Falls, I stopped the sleigh from time to time to listen for the roar of the cataracts, but the state of the atmosphere was not favorable for the transmission of sound, and the silence was unbroken. 1836 Jameson

Such was the deep, monotonous tranquility which prevailed on every side — so exquisitely pure and vestal-like the robe in which all nature lay slumbering around us, I could scarce believe that this whole frontier district is not only remarkable for the prevalence of vice, but of dark and desperate crime.

Mr. A., who is a magistrate, pointed out to me a lonely house by the way-side, where, on a dark stormy night in the preceding winter, he had surprised and arrested a gang of forgers and coiners; it was a fearful description. For some time my impatience had been thus beguiled — impatience and suspense much like those of a child at a theatre before the curtain rises. My imagination had been so impressed by the vast height of the Falls, that I was constantly looking in an upward direction, when,

1836
Jameson

as we came to the brow of a hill, my companion suddenly checked the horses, and exclaimed, "The Falls!"

I was not, for an instant, aware of their presence; we were yet at a distance, looking *down* upon them; and I saw at one glance a flat extensive plain; the sun having withdrawn its beams for the moment, there was neither light, nor shade, nor color. In the midst were seen the two great cataracts, but merely as a feature in the wide landscape. The sound was by no means overpowering, and the clouds of spray, which Fanny Butler called so beautifully the "everlasting incense of the waters," now condensed ere they rose by the excessive cold, fell round the base of the cataracts in fleecy folds, just concealing that furious embrace of the waters above and the waters below. All the associations which in imagination I had gathered round the scene, its appalling terrors, its soul-subduing beauty, power and height, and velocity and immensity, were all diminished in effect, or wholly lost.

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I was quite silent — my very soul sunk within me. On seeing my disappointment (written, I suppose, most legibly in my countenance) my companion began to comfort me, by telling me of all those who had been disappointed on the first view of Niagara, and had confessed it. I *did* confess; but I was not to be comforted. We held on our way to the Clifton hotel, at the foot of the hill; most desolate it looked with its summer verandahs and open balconies cumbered up with snow, and hung round with icicles — its forlorn, empty rooms, broken windows, and dusty dinner tables. The poor people who kept the house in winter had gathered themselves for warmth and comfort into a little kitchen, and when we made our appearance, stared at us with a blank amazement, which showed what a rare thing was the sight of a visitor at this season.

. . . . . .

We now prepared to walk to the Crescent fall, and I bound some crampons to my feet, like those they use among the Alps,

without which I could not for a moment have kept my footing on the frozen surface of the snow. As we approached the Table Rock, the whole scene assumed a wild and wonderful magnificence; down came the dark-green waters, hurrying with them over the edge of the precipice enormous blocks of ice brought down from Lake Erie. On each side of the Falls, from the ledges and overhanging cliffs, were suspended huge icicles, some twenty, some thirty feet in length, thicker than the body of a man, and in color of a paly green, like the glaciers of the Alps; and all the crags below, which projected from the boiling eddying waters, were incrusted, and in a manner built around with ice, which had formed into immense crystals, like basaltic columns, such as I have seen in the pictures of Staffa and the Giant's Causeway; and every tree, and leaf, and branch, fringing the rocks and ravines, were wrought in ice. On them, and on the wooden buildings erected near the Table Rock, the spray from the cataract had accumulated and formed into the most beautiful crystals and tracery work; they looked like houses of glass, welted and moulded into regular and ornamental shapes, and hung round with a rich fringe of icy points. Wherever we stood we were on unsafe ground, for the snow, when heaped up as now to the height of three or four feet, frequently slipped in masses from the bare rock, and on its surface the spray, for ever falling, was converted into a sheet of ice, smooth, compact and glassy, on which I could not have stood a moment without my *crampons*. It was very fearful, and yet I could not tear myself away, but remained on the Table Rock, even on the very edge of it, till a kind of dreamy fascination came over me; the continuous thunder, and might and movement of the lapsing waters, held all my vital spirits bound up as by a spell. Then, as at last I turned away, the descending sun broke out, and an Iris appeared below the American Fall, one extremity resting on a snow mound; and motionless there it hung in the midst of restless terrors, its beautiful but rather pale hues contrasting with the

1836 Jameson

1836
Jameson

death-like colorless objects around; it reminded me of the faint ethereal smile of a dying martyr.

. . . It was near midnight when we mounted our sleigh to return to the town of Niagara, and, as I remember, I did not utter a word during the whole fourteen miles. The air was still, though keen, the snow lay around, the whole earth seemed to slumber in a ghastly, calm repose; but the heavens were wide awake. There the Aurora Borealis was holding her revels, and dancing and flashing, and varying through all shapes and all hues — pale amber, rose tint, blood red — and the stars shone out with a fitful, restless brilliance; and every now and then a meteor would shoot athwart the skies, or fall to earth, and all around me was wild, and strange, and exciting — more like a fever dream than a reality.

. . . The Falls did not make on my mind the impression I had anticipated, perhaps for that reason, even because I had *anticipated* it. Under different circumstances it might have been otherwise; but "it was sung to me in my cradle," as the Germans say, that I should live to be disappointed — even in the Falls of Niagara.

. . . The moment I was alone, I hurried down to the Table-rock. The body of water was more full and tremendous than in the winter. The spray rose, densely falling again in thick showers, and behind those rolling volumes of vapor the last gleams of the evening light shone in lurid brightness, amid amber and crimson clouds; on the other side, night was rapidly coming on, and all was black, impenetrable gloom, and "boundless contiguity of shade." It was very, very beautiful, and strangely awful too! For now it was late, and as I stood there, lost in a thousand reveries, there was no human being near, no light but that reflected from the leaping, whirling foam; and in spite of the deep-voiced continuous thunder of the cataract, there was such a stillness that I could hear my own heart's pulse throb — or did I mistake feeling for hearing? — so I strayed home-

wards, or housewards I should say, through the leafy, gloomy, pathways — wet with the spray, and fairly tired out. 1836 Jameson

. . . . .

We drove along the road *above* the Falls. There was the wide river spreading like a vast lake, then narrowing, then boiling, foaming along in a current of eighteen miles an hour, till it swept over the Crescent rock in a sheet of emerald green, and threw up the silver clouds of spray into the clear blue sky. The fresh luxurious verdure of the woods, relieved against the dark pine forest, added to the beauty of scene. . . . After a pleasant dinner and music, I returned to the hotel by the light of a full moon, beneath which the Falls looked magnificently mysterious, part glancing silver light, and part dark shadow, mingled with fleecy folds of spray, over which floated a soft, sleepy gleam; and in the midst of this tremendous velocity of motion and eternity of sound, there was a deep, deep repose, as in a dream. It impressed me for the time like something supernatural — a vision, not a reality.

. . . . .

The good people, travellers, describers, poets, and others, who seem to have hunted through the dictionary for words in which to depict these cataracts under every aspect, have never said enough of the rapids above — even for which reason, perhaps, they have struck me the more; not that any words in any language would have prepared me for what I now feel in this wondrous scene. Standing to-day on the banks above the Crescent Fall, near Mr. Street's mill, gazing on the rapids, they left in my fancy two impressions which seldom meet together — that of the sublime and terrible, and that of the elegant and graceful — like a tiger at play. I could not withdraw my eyes; it was like a fascination.

The verge of the rapids is considerably above the eye; the whole mighty river comes rushing over the brow of a hill, and as you look up, it seems coming down to overwhelm you. Then meeting with the rocks, as it pours down the declivity, it boils

1836
Jameson

and frets like the breakers of the ocean. Huge mounds of water, smooth, transparent, and gleaming like the emerald, or rather like the more delicate hue of the chrysopaz, rise up and bound over some unseen impediment, then break into silver foam, which leaps into the air in the most graceful fantastic forms; and so it rushes on, whirling, boiling, dancing, sparkling along, with a playful impatience, rather than overwhelming fury, rejoicing as if escaped from bondage, rather than raging in angry might — wildly, magnificently beautiful! The idea, too, of the immediate danger, the consciousness that any thing caught within its verge is inevitably hurried to a swift destination, swallowed up, annihilated, thrills the blood; the immensity of the picture, spreading a mile at least each way, and framed in by the interminable forests, adds to the feeling of grandeur: while the giddy, infinite motion of the headlong waters, dancing and leaping, and revelling and roaring, in their mad glee, gave me a sensation of rapturous terror, and at last caused a tension of the nerves in my head, which obliged me to turn away.

The great ocean, when thus agitated by conflicting winds or opposing rocks, is a more tremendous thing, but it is merely tremendous — it makes us think of our prayers; whereas, while I was looking on these rapids, beauty and terror, power and joy, were blended, and so thoroughly, that even while I trembled and admired, I could have burst into a wild laugh, and joined the dancing billows in their glorious, fearful mirth —

> Leaping like Bacchanals from rock to rock,
> Flinging the frantic Thyrsus wild and high!

I shall never see again, or feel again, aught like it — never! I did not think there was an object in nature, animate or inanimate, that could thus overset me *now!*

. . . . .

Accompanied the family of Colonel Delatre to the American side, and dined on Goat Island. Though the various views of the two cataracts be here wonderfully grand and beautiful, and the bridge across the rapids a sort of miracle, as they say, still it is

not altogether to be compared to the Canadian shore for pic- 1836
turesque scenery. The Americans have disfigured their share of Jameson
the rapids with mills and manufactories, and horrid red brick houses, and other unacceptable, unseasonable sights and signs of sordid industry. Worse than all is the round tower, which some profane wretch has erected on the Crescent Fall; it stands there so detestably impudent and *mal-à-propos* — it is such a signal yet puny monument of bad taste — so miserably *mesquin*, and so presumptuous, that I do hope the violated majesty of nature will take the matter in hand, and overwhelm or cast it down the precipice one of these fine days, though indeed a barrel of gunpowder were a shorter if not a surer method. . . .

. . . . .

The people who have spoken or written of these Falls of Niagara, have surely never done justice to their loveliness, their inexpressible, inconceivable beauty. The feeling of their beauty has become with me a deeper feeling than that of their sublimity. What a scene this evening! What splendor of color! The emerald and chrysopaz of the transparent waters, the dazzling gleam of the foam, and the snow-white vapor on which was displayed the most perfect and gigantic iris I ever beheld — forming not a half, but at least two-thirds of an entire circle, one extremity resting on the lesser (or American) Fall, the other in the very lap of the Crescent Fall, spanning perhaps half a mile, perfectly resplendent in hue — so gorgeous, so vivid, and yet so ethereally delicate, and apparently within a few feet of the eye; the vapors rising into the blue heavens at least four hundred feet, three times the height of the Falls, and tinted rose and amber with the evening sun; and over the woods around every possible variety of the richest foliage — no, nothing was ever so transcendently lovely! The effect, too, was so grandly uniform in its eternal sound and movement, it was quite different from those wild, impatient, tumultuous rapids. It soothed, it melted, it composed, rather than excited.

1836
Jameson

There are no water-fowl now as in the winter — when driven from the ice-bound shores and shallows of the lake, they came up here to seek their food, and sported and wheeled amid the showers of spray. They have returned to their old quiet haunts; sometimes I miss them; they were a beautiful variety in the picture.

. . . . .

Perhaps even for my sake you may now and then look upon a map of Canada, and there . . . you will find not a few towns and cities laid down by name which you might in vain look for within the precincts of the province, seeing that they are non-extant, as yet, at least, though full surely *to be*, some time or other, somewhere or other, when this fair country shall have fair play, and its fair quota of population. But from this anticipation I would willingly except a certain CITY OF THE FALLS which I have seen marked on so many maps, and mentioned in so many books, as already laid out and commenced, that I had no doubt of its existence till I came here for the first time last winter. But here it is not — *Grazie a Dio!* — nor likely to be, as far as I can judge, for a century to come. Were a city to rise here, it would necessarily become a manufacturing place, because of the "water powers and privileges," below and above the cataract, which would then be turned to account. Fancy, if you can, a range of cotton factories, iron foundries, grist mills, saw mills, where now the mighty waters rush along in glee and liberty — where the maple and the pine woods now bend and wave along the heights. Surely they have done enough already with their wooden hotels, museums, and curiosity stalls: neither in such a case were red brick tenements, gas-lights, and smoky chimneys, the worst abomination to be feared. There would be a moral pollution brought into this majestic scene, far more degrading; more than all those rushing waters, with their "thirteen millions of tons per minute," could wash away.

1836
Preston

PRESTON, T. R. Three years' residence in Canada, from 1837 to 1839, with notes of a winter voyage to New York, and journey thence to the British possessions. Lond.: Richard Bentley. 1840. 2:11–20.

1836
Preston

The way in which I found that I could best comprehend the magnitude and character of the stupendous cataract, was by lying flat upon the ground in its near vicinity, mentally dissecting it as it were whilst so recumbent, and then forming combinations of the particles *ad infinitum*. I know not if this suggestion be, or not, a novel one; but in my own case, its adoption was the result of accident, as I found that, when close upon them, I could not regard the Falls for many minutes together in an erect posture, without succumbing to an attracting influence, which I can compare only to the fascination exercised by the loadstone or the eye of the rattle-snake. I, therefore, adopted the alternative of prostrating myself (which answered the two-fold purpose of reverence and convenience), and was in such wise enabled to contemplate, for hours together, without apprehension for my personal safety, the stupendous monument of ages that stood reared before me.

Another means of arriving at a right appreciation of the magnitude of the Falls, is to perch yourself on the summit of the tower which stands upon a ledge of rock just below Goat Island, and to look down from thence, not upon the Falls, but upon the *centre* of the rapids, and then following with your eye the maddened waters, as they converge, seemingly grasped by the outstretched fingers (gathering from all points) of a concealed giant's hand, towards the middle of the Chute, trace them until they are finally precipitated into the troubled vortex below.

All immediately above, as also immediately beneath the sheet of water projected over, appears to be hurry, turmoil, wrath, and wild confusion; in the midst of which the propelled body, as if tacitly chiding the struggling waters in its rear for the display of so much petulant impatience, assumes to itself a calm placid dignity and business-like air, implying that there exists *no necessity for haste*, and drops, by means of its dense cubic weight, in close compact solidity to the bottom.

. . . . .

1836
Preston

As regards the realization of grand scenic effect in the appearance of the Falls, I fully concur in the opinion I have seen expressed, that the best means of inducing it consist in crossing the river at the ferry, to within about one-fourth of the distance from the American shore, and in so directing your gaze from such point of view (never heeding the tossing, nor the saturation consequent on remaining in such a position), as to take in the American and British Falls *together*, Goat Island, which lies between them, being entirely shut in by the oblique line of vision. . . .

On the occasion of my visit to the Falls, which chanced to be just after the opening of the navigation, they still retained some portion of their wintry dress. On the second, on the contrary, their environing adornments were green trees and foliage, but it is to my mind doubtful even now, if these, after all, were so much in unison with the peculiar character of the main object, as the previous accumulated snow and clustering icicles.

The author points out the need of "close solitary studying" in order to get really acquainted with the Falls, and suggests ways of bringing one's self into proper comprehension of the grandeur of the scene. He feels impelled to give utterance to the thoughts with which the Falls inspire him.

1836
Thomas

THOMAS, *Rev.* ABEL C. Autobiography. Boston: J. M. Usher. 1852. Pp. 211–213.

An account of a visit made in May, 1837. The author preached on Table Rock. We quote from his own account. "The congregation consisted of Rev. Russell Tomlinson and Rev. K. Townsend — Table Rock was both Pulpit and Pew — and my text, 'There was a Rainbow round about the throne'." The discourse was on the seven attributes of the Supreme Being symbolized by the bow.

1836
Wilkie

WILKIE, D. Sketches of a summer trip to New York and the Canadas. Edinb. 1837. Pp. 100–102.

As the diamond is set in metal of the least gaudy hue, so, we really believe the true sublimity of the Falls would be heightened were the soil around shorn of the leafy fringe which decks the verge of the stream; for in that case nothing would be left to

attract the slightest part of our attention from the simple, but sublime spectacle before us. It is quite enough of itself to fill the mind with all the awe and admiration which such objects are capable of inspiring. 1836 Wilkie

1838

BUCKINGHAM, JAMES SILK. America historical, statistic and descriptive. Lond.: Fisher. (1841.) 2:498–534. 1838 Buckingham

The author visited the Falls in August, 1838. He gives a detailed description of the scenery and the impressions created by the different points of view. His lines addressed to Niagara are much quoted.

BUCKINGHAM, JAMES SILK. The eastern and western states of America. Lond. and Paris: Fisher, Son. (1843.) 3:452–471.

The succeeding morning opened with rain, the only aspect under which we had not yet seen the Falls; and though it confined us to the hotel during the early part of the day, we were enabled to continue our excursions in the evening, and had not, therefore, much cause for regret. One effect of the rain was to produce a much greater appearance of mist rising from the bottom of the Fall, the column or cloud ascending sometimes 100 feet above its ordinary line of height. Another effect, produced by the strong west wind that blew was to accelerate the speed of the current above the Falls, and consequently to send a much larger volume of water over both. We were assured, by those who constantly reside here, that an easterly wind keeps back the current, and a westerly one accelerates it, to a degree sufficient to make a difference of from 20 to 30 feet in the elevation of the surface in the Strait below. This we could readily believe, from the increased fury of the Rapids above, whose waves were much more lofty, and their foam a more continuous and unbroken white than yesterday, while the mass of waters rolling over the upper edge of the Falls, seemed to leap farther out from the rock, and plunge with greater force into the stream below, from which, by this increased impetus of descent, and the general moisture of the upper atmosphere com-

1838 Buckingham bined, the mist rose in clouds so thick, as sometimes to veil the surface of the Cataract, and then become gradually transparent like a thin sheet of the finest muslin. At intervals, when the sun shone out, the rainbows at the feet of both the Falls, were splendid, sometimes stationary, arched, and of the most vivid and clearly defined colours; at others, presenting a sort of rainbow clouds, where bodies of mist would have all the prismatic rays marked on them, but in a floating and undulating series of curves, advancing and receding, so as to form a wavy line, in perpetual motion, as if some colossal serpent of the mist was straining to ascend perpendicularly over the cliff, and waving the folds of his body in that undulating motion called serpentine, reflecting the prismatic rays from every part as it moved; it was altogether an unusual and most brilliant sight, and an ample compensation for the rainy morning in which it was seen.

The above extract is quoted as giving a good description of the Falls on a rainy morning, an aspect under which few authors have written of them. It gives also a detailed account of the rainbows seen at the foot of the Falls and the effect of the rain upon the mist arising from the stream below.

BUCKINGHAM, JAMES SILK. The Falls of Niagara. (British and foreign institute, transactions. Lond.: 1845. 1:401–403.)

Reading from Buckingham's *Journal of tour in United States.* Gives a description of the Falls and a poem, the latter written on the spot.

1838 A chapter on Niagara. (Am. month. mag. June, 1838. 11(n.s.5): 529–535.)

An appreciation of Niagara in warmest terms, not overdone and written in good literary style.

1838 More leaves from Mr. Keeley's journal. (Colburn's new mo. mag., 1838. 53:191–197.)

1838 Gurney GURNEY, JOSEPH JOHN. A journey in North America, described in familiar letters to Amelia Opie. Norwich: Printed for private circulation. 1841. Pp. 317–324.

A lucid and interesting account of the Falls from below on the American side, the view from the Canadian side, the beauties of Goat Island, the drive to Lewiston, the geology of the country,

JOINVILLE, F. F. P. L. M. D'O., *Prince de.* Memoirs, vieux souvenirs, of the Prince de Joinville; tr. from the French by Lady Mary Loyd. N. Y.: Macmillan. 1895. P. 116. 1838 Joinville

A very brief account of a visit to the Falls in 1838 apparently. He writes: "After Philadelphia came Niagara wonderful and peerless. I admired its picturesque grandeur, but I admired the rapids before the fall every bit as much."

LOGAN, JAMES. Notes of a journey through Canada, the United States of America, and the West Indies. Edinb.: 1838. Pp. 138–140. 1838 Logan

1838

A day at the falls. (Colburn's new mo. mag., 1838. 4:482–483.) 1838

The author's visit was made in July, twelve or fourteen years before the date of publication. In his description of the Falls he notes the existence of a billiard room on Goat Island.

1839

MARRYAT, FREDERICK, *Captain.* Diary in America, with remarks on its institutions. Lond.: Longman, Orme, Brown, Green, and Longman. 1839. 1:159–165. 1839 Marryat

As I stood on the brink above the falls, continuing for a considerable time to watch the great mass of water tumbling, dancing, capering, and rushing wildly along, as if in a hurry to take the leap and delighted at it, I could not help wishing that I too had been made of such stuff as would have enabled me to have joined it; with it to have rushed innocuously down the precipice; to have rolled uninjured into the deep unfathomable gulf below, or to have gamboled in the atmosphere of spray, which rose again in a dense cloud from its recesses. For about half an hour more I continued to watch the rolling waters and then I felt a slight dizziness and a creeping sensation come over me — that sensation arising from strong excitement, and the same, probably, that occasions the bird to fall into the jaws of the snake. This is a feeling which, if too long indulged in, becomes irresistible, and occasions a craving desire to leap into the flood of rushing waters. It increased upon me every minute; and retreating from the brink, I turned my eyes to the surrounding foliage, until the effect of the excitement had passed away. I

1840 Marryat

looked upon the waters a second time, and then my thoughts were directed into a very different channel. I wished myself a magician, that I might transport the falls to Italy, and pour their whole volume of waters into the crater of Mount Vesuvius; witness the terrible conflict between the contending elements, and create the largest steam-boiler that ever entered into the imagination of man.

This diary " is to be found in various editions, English and American." The author gives expression to the not unusual desire of visitors to the Falls to leap into the foaming waters, and indulges " in much whimsical writing." " I wished myself a magician, that I might transport the Falls to Italy, and pour their whole volume of water into the crater of Mount Vesuvius: witness the terrible conflict between the contending elements, and create the largest steam-boiler that ever entered into the imagination of man."

1840 Combe

COMBE, GEORGE. Notes on the United States of North America during a phrenological visit in 1838–9–40. Phila.: Cary and Hart. 1841. 2:79–80.

Brief and compact account touching on many features. " I was far less impressed by its sublimity than by its beauty: it is full of grace and majesty, and emotions of pleasure were constantly predominant while I gazed on it."

1840 Maxwell

MAXWELL, ARCHIBALD MONTGOMERY. A run through the United States during the autumn of 1840. Lond.: Henry Colburn. 1841. 1:260–287. 2:1–10.

The author visited the Falls in September, 1840, and wrote these letters giving a most enthusiastic account of his rambles about the Falls with a description of the cataract both by night and day. The account is interspersed with anecdotes and personal touches. He feels that the " hopes and anticipation of years are more than realized " in this " unspeakably sublime and magnificent view," which he, however, finally quitted " without regret."

1840 Waylen

WAYLEN, *Rev.* EDWARD. Ecclesiastical reminiscences of the United States. Lond.: Straker. 1846. Pp. 281–283.

The record of two days spent at the Falls in June, 1840. "The cataract spanned by its perpetual bow, and the deep, steady, constant roll of the measureless volume of water enchained us in speechless admiration and wonder."

Summary

The year 1840 has been set, rather arbitrarily perhaps, as the limit of this chapter. The only justification for the choice of this date is that it fixes a sort of high-water mark in the production of Niagara Falls literature, for by that time not only had nearly half the book-writing visitors of the nineteenth century published their accounts but after that date there was a steady diminution in the annual output on the subject.

The accounts quoted present plenty of evidence that the tourist procession to Niagara was well begun even as early as 1818. The bulk of the literature of our period, however, falls between 1825 and 1840. The difficulties of travel at the opening of the century and the war with England probably contributed much to the comparative literary barrenness of the early years. The opening of the Erie Canal in 1825 and the multiplication of railroad facilities in the thirties no doubt were important factors in the promotion of travel to Niagara. The accounts quoted bear witness to the increased accessibility of the Falls. The primitive wilderness was slowly but surely giving way before the approach of civilization. The land along the river was being cleared, towns were springing up within sight of the Falls, and writers were already lamenting the probable intrusion of industry.

It is interesting to notice the character of the tourists who wrote of Niagara in this period. It is evident that though many nationalities are represented, the majority of the visitors are English, and that in the production of Niagara literature women share the laurels with men. As in the previous periods, there is much mediocre writing, but on the whole the accounts are of a higher grade than in the earlier period. Indeed it is no misnomer, when the standard of excellence is set by such accounts as those of Margaret Fuller, Harriet Martineau, Caroline Gilman, and Nathaniel Hawthorne, to speak of Niagara *literature*.

It is quite evident from the accounts cited that the personal equation plays a large part at Niagara. The writing is of every

type, varying from matter-of-fact description or cold criticism of scenic effects to the profoundest religious reflection and most exclamatory rhapsody. Moreover, it takes but the most cursory examination of this great variety of Niagara expression to make clear that the literature of the Falls is a record not merely of facts concerning the Falls but a study of the effect which the spectacle had on the writer in question. Many authors confess to keen disappointment while others find the reality far in excess of their liveliest expectations. We gather that dizziness and depression of spirit held equal sway with pleasure and fascination. Some observers are moved to tears, others struck dumb by the sight, while still others testify to utter forgetfulness of self and their surroundings for hours at a time. In some cases the effect of the falling waters is so great as to inspire an almost uncontrollable desire to leap into the foaming tide. It is perhaps this power of the cataract to lure to self-destruction that the Indians tried to explain in their legend that the Falls demand four victims annually. Be the explanation what it may, this psychological effect of the Falls on certain temperaments is an interesting study.

Chapter IV

CHAPTER IV

TRAVELERS' ORIGINAL ACCOUNTS SINCE 1840

1840

STEELE, ELIZA R. A summer journey in the West. N. Y.: S. Taylor. 1841. Pp. 54–65. 1840 Steele

A minute description by a quick and sympathetic observer, who visited the Falls in 1840.

1841

BONNYCASTLE, *Sir* RICHARD H. The Canadas in 1841. Lond.: Henry Colburn. 1842. 1:215–260. 1841 Bonnycastle

A detailed description, in pleasant style, of the various points of view at Niagara. The author was a good observer and from long residence in the Niagara region as a British government engineer and road-maker competent to speak with knowledge and authority concerning conditions around the Falls.

DICKENS, CHARLES. American notes for general circulation. Lond.: Chapman and Hall. 1842. 2:176–180. 1841 Dickens

. . . Between five and six next morning, we arrived at Buffalo, where we breakfasted; and being too near the Great Falls to wait patiently anywhere else, we set off by the train, the same morning at nine o'clock, to Niagara.

It was a miserable day; chilly and raw; a damp mist falling; and the trees in that northern region quite bare and wintry. Whenever the train halted, I listened for the roar; and was

1841
Dickens

constantly straining my eyes in the direction where I knew the Falls must be, from seeing the river rolling on towards them; every moment expecting to behold the spray. Within a few minutes of our stopping, not before, I saw two great white clouds rising up slowly and majestically from the depths of the earth. That was all. At length we alighted: and then for the first time, I heard the mighty rush of water, and felt the ground tremble underneath my feet.

The bank is very steep, and was slippery with rain, and half-melted ice. I hardly know how I got down, but I was soon at the bottom, and climbing, with two English officers who were crossing and had joined me, over some broken rocks, deafened by the noise, half-blinded by the spray, and wet to the skin. We were at the foot of the American Fall. I could see an immense torrent of water tearing headlong down from some great height, but had no idea of shape, or situation, or anything but vague immensity.

When we were seated in the little ferry-boat, and were crossing the swoln river immediately before both cataracts, I began to feel what it was: but I was in a manner stunned, and unable to comprehend the vastness of the scene. It was not until I came on Table Rock, and looked — Great Heaven, on what a fall of bright-green water! — that it came upon me in its full might and majesty.

Then, when I felt how near to my Creator I was standing, the first effect, and the enduring one — instant and lasting — of the tremendous spectacle, was Peace. Peace of Mind: Tranquillity: Calm recollections of the Dead: Great Thoughts of Eternal Rest and Happiness: nothing of Gloom or Terror. Niagara was at once stamped upon my heart, an Image of Beauty; to remain there, changeless and indelible, until its pulses cease to beat, for ever.

Oh, how the strife and trouble of our daily life receded from my view, and lessened in the distance, during the ten memorable days we passed on that Enchanted Ground! What voices spoke

from out the thundering water; what faces, faded from the earth, looked out upon me from its gleaming depths; what Heavenly promise glistened in those angels' tears, the drops of many hues, that showered around, and twined themselves about the gorgeous arches which the changing rainbows made! 1841 Dickens

I never stirred in all that time from the Canadian side, whither I had gone at first. I never crossed the river again; for I knew there were people on the other shore, and in such a place it is natural to shun strange company. To wander to and fro all day, and see the cataracts from all points of view; to stand upon the edge of the Great Horse Shoe Fall, marking the hurried water gathering strength as it approached the verge, yet seeming, too, to pause before it shot into the gulf below; to gaze from the river's level up at the torrent as it came streaming down; to climb the neighbouring heights and watch it through the trees, and see the wreathing water in the rapids hurrying on to take its fearful plunge, to linger in the shadow of the solemn rocks three miles below; watching the river as, stirred by no visible cause, it heaved and eddied and awoke the echoes, being troubled yet, far down beneath the surface, by its giant leap; to have Niagara before me, lighted by the sun and by the moon, red in the day's decline, and grey as evening slowly fell upon it; to look upon it every day, and wake up in the night and hear its ceaseless voice: this was enough.

I think in every quiet season now, still do those waters roll and leap, and roar and tumble, all day long; still are the rainbows spanning them, a hundred feet below. Still, when the sun is on them, do they shine and glow like molten gold. Still, when the day is gloomy, do they fall like snow, or seem to crumble away like the front of a great chalk cliff, or roll adown the rock like dense white smoke. But always does the mighty stream appear to die as it comes down, and always from its unfathomable grave arises that tremendous ghost of spray and mist which is never laid: which has haunted this place with the same dread solemnity since Darkness brooded on the deep, and that first flood before the

1841 Dickens

Deluge — Light — came rushing on Creation at the word of God.

This is perhaps the most widely quoted of the modern descriptions of the Falls.

1841 Farley

FARLEY, *Rev.* FREDERICK A. A visit to Niagara. (Lynch, Anna C. The Rhode Island book. Providence: Fuller. 1841. Pp. 69–80.)

After recounting the delights of the journey from New York, the author describes his emotions at the sight of the Falls. He felt the visit to Niagara was " one of the holiest pilgrimages of life."

1841 Sturge

STURGE, JOSEPH. A visit to the United States in 1841. Lond.: Hamilton, Adams. 1842. P. 111.

No attempt to describe the Falls, " a spectacle of nature in her grandest aspects which mocks the limited capacity of man to conceive or to describe."

1841 Worcester

WORCESTER, JAMES. Cataract of Niagara. (Literary souvenir; a weekly journal of literature, science and the arts. Lowell. June 19, 1841. 2:185–186.)

Taken from a manuscript book of travel which had been intended for publication but was withdrawn. It consists for the most part of quotations from Howison's " Upper Canada."

1842

1842 Godley

GODLEY, JOHN ROBERT. Letters from America. Lond.: John Murray. 1844. 1:132–139.

Another English visitor.

Not that, to speak the truth, the sound is near so great as I expected; I do not think we heard it till we were within half a mile; and at this moment, though every pane of glass in the house is rattling, and every article of furniture is shaking, still the noise of the falls, which are distant about three hundred yards, is by no means aggressive or overpowering; on the contrary, it is a kind of deep, massive boom, like distant thunder. . . .

Now I am not going to do anything so foolish as to attempt a description of the Falls, nor would you be much wiser if I did. I will only say that if I was disappointed at *the first glance*,

it was my own fault, for instead of getting the first view from the Table Rock on the British side,— where you stand opposite to, and at a sufficient distance from the Great Fall,— we were misled into taking a position quite close to one corner of it, and absolutely overlooking the abyss, so that the cloud of spray and foam which is continually rising, hid the true shape and extent of the cataract from us. When I did afterwards come to see it thoroughly, I could not imagine anybody being disappointed, at least I cannot conceive what such a person could have expected to see: but after all, what is the impression which Niagara makes on us, who have all our lives been reading accounts, and seeing pictures and models of it, compared to that which it must have made on the first civilized, or at least white man, probably some hunter or trader, who suddenly, and unprepared perhaps, came upon it in the solitude of the forest, and feasted his eyes upon its wonders? I should think astonishment and awe must almost have deprived him of his senses. Imagine his attempts to describe it afterwards to those who had never heard of anything of the sort,— for the peculiarity of Niagara is, that there is "*nihil simile aut secundum*," nothing near it, or like it in the world! My mind has been continually reverting to this idea. 1842 Godley

1843

ADAMS, JOHN QUINCY. (Speech on Niagara Falls.) (*In* A souvenir of Niagara. Buffalo: Sage. 1864. P. 128.) 1843 Adams

You have what no other nation on earth has. At your very door there is a mighty cataract — one of the most wonderful works of God. I have passed through the seventh and nearly half of the eighth decade of life, and yet, until a few days ago, I had known of the cataract only by name and the common fame of the historian. But now I have seen it! Yes, I have seen it in all its sublimity and glory — and I have never witnessed a scene its equal. I experience the same feeling in your presence as when I saw it — there is left in my mind a deep impression which will last with my life — a feeling overpowering, and which

1843
Adams

takes away the power of speech by its grandeur and sublimity, contrasted with the eddying river above, the rippling current below, and the rainbow, a pledge of God to mankind that the destruction from the waters shall not again visit the earth. I say, altogether it takes away language as well as thought: and in this enraptured condition one is almost capable of prophesying — standing as it were in a trance, unable to speak. . . .

I have been at Lundy's Lane and at Chippewa. . . . I have seen no memento of that political era between these two countries — divided by that natural phenomenon between the two, as if heaven had considered it too much for one. There I have been received as a friend with friendly greeting, and I ejaculate a prayer to God, that this state of temper may be perpetual, and that the land of war and of garments rolled in blood may never again be exhibited.

Adams was at the Falls in 1843 and made the speech just quoted at Buffalo a few days after his visit to the cataract.

1843
Moore

MOORE, GEORGE. Journal of a voyage across the Atlantic; with notes on Canada and United States . . . in 1844. Lond.: Printed for private circulation, 1845. Pp. 59–62.

Oh my God! how I was stunned and unable to comprehend the vastness of the scene! It was not until I reached Table Rock, and looked upon the fall of bright green water, that it came upon me in its full might and majesty. Niagara was at once stamped upon my heart an image of beauty, to remain there changeless and indelible until it ceases to beat.

The record of a visit made in September, 1843.

1843
Ossoli

OSSOLI, SARAH MARGARET FULLER, *Marchesa* D'. Summer on the lakes, in 1843. . . . Bost.: Little and Brown; N. Y.: Francis. 1844. Pp. 1–13.

Niagara, June 10, 1843.

Since you are to share with me such foot-notes as may be made on the pages of my life during this summer's wanderings, I should not be quite silent as to this magnificent prologue to the,

as yet, unknown drama. Yet I, like others, have little to say where the spectacle is, for once, great enough to fill the whole life, and supersede thought, giving us only its own presence. "It is good to be here." is the best as the simplest expression that occurs to the mind. 1843 Ossoli

We have been here eight days, and I am quite willing to go away. So great a sight soon satisfies, making us content with itself, and with what is less than itself. Our desires, once realized, haunt us again less readily. Having "lived one day," we would depart, and become worthy to live another.

We have not been fortunate in weather, for there cannot be too much, or too warm sunlight for this scene, and the skies have been lowering, with cold, unkind winds. My nerves, too much braced up by such an atmosphere, do not well bear the continual stress of sight and sound. For here there is no escape from the weight of a perpetual creation; all other forms and motions come and go, the tide rises and recedes, the wind, at its mightiest, moves in gales and gusts, but here is really an incessant, an indefatigable motion. Awake or asleep, there is no escape, still this rushing round you and through you. It is in this way I have most felt the grandeur — somewhat eternal, if not infinite.

At times a secondary music rises; the cataract seems to seize its own rhythm and sing it over again, so that the ear and soul are roused by a double vibration. This is some effect of the wind, causing echoes to the thundering anthem. It is very sublime, giving the effect of a spirtual repetition through all the spheres.

When I first came I felt nothing but a quiet satisfaction. I found that drawings, the panorama, &c. had given me a clear notion of the position and proportion of all objects here; I knew where to look for everything, and everything looked as I thought it would.

Long ago, I was looking from a hill-side with a friend at one of the finest sunsets that ever enriched this world. A little cowboy, trudging along, wondered what we could be gazing at. After spying about some time, he found it could only be the

1843
Ossoli

sunset, and looking, too, a moment, he said approvingly "that sun looks well enough;" a speech worthy of Shakespeare's Cloten, or the infant Mercury, up to everything from the cradle, as you please to take it.

Even such a familiarity, worthy of Jonathan, our national hero, in a prince's palace, or "stumping" as he boasts to have done, "up the Vatican stairs, into the Pope's presence, in my old boots," I felt here; it looks really *well enough*, I felt, and was inclined, as you suggested, to give my approbation as to the one object in the world that would not disappoint.

But all great expression, which, on a superficial survey, seems so easy as well as so simple, furnishes, after a while, to the faithful observer its own standard by which to appreciate it. Daily these proportions widened and towered more and more upon my sight, and I got, at last, a proper foreground for these sublime distances. Before coming away, I think I really saw the full wonder of the scene. After a while it so drew me into itself as to inspire an undefined dread, such as I never knew before, such as may be felt when death is about to usher us into a new existence. The perpetual trampling of the waters seized my senses. I felt that no other sound, however near, could be heard, and would start and look behind me for a foe. I realized the identity of that mood of nature in which these waters were poured down with such absorbing force, with that in which the Indian was shaped on the same soil. For continually upon my mind came, unsought and unwelcome, images, such as never haunted it before, of naked savages stealing behind me with uplifted tomahawks; again and again this illusion recurred, and even after I had thought it over, and tried to shake it off, I could not help starting and looking behind me.

As picture, the Falls can only be seen from the British side. There they are seen in their veils, and at sufficient distance to appreciate the magical effects of these, and the light and shade. From the boat, as you cross, the effects and contrasts are more melodramatic. On the road back from the whirlpool, we saw

them as a reduced picture with delight. But what I liked best was to sit on Table Rock, close to the great fall. There all power of observing details, all separate consciousness, was quite lost. 1843 Ossoli

. . . . .

The whirlpool I like very much. It is seen to advantage after the great falls; it is so sternly solemn. The river cannot look more imperturable, almost sullen in its marble green, than it does just below the great fall; but the slight circles that mark the hidden vortex, seem to whisper mysteries the thundering voice above could not proclaim,— a meaning as untold as ever.

It is fearful, too, to know, as you look, that whatever has been swallowed by the cataract, is like to rise suddenly to light here, whether uprooted tree, or body of man or bird.

The rapids enchanted me far beyond what I expected; they are so swift that they cease to seem so; you can think only of their beauty. The fountain beyond the Moss Islands, I discovered for myself, and thought it for some time an accidental beauty which it would not do to leave, lest I might never see it again. After I found it permanent, I returned many times to watch the play of its crest. In the little waterfall beyond, nature seems, as she often does, to have made a study for some larger design. She delights in this,— a sketch within a sketch, a dream within a dream. Wherever we see it, the lines of the great buttress in the fragment of stone, the hues of the waterfall, copied in the flowers that star its bordering mosses, we are delighted; for all the lineaments become fluent, and we mould the scene in congenial thought with its genius.

People complain of the buildings at Niagara, and fear to see it further deformed. I cannot sympathize with such an apprehension: the spectacle is capable to swallow up all such objects; they are not seen in the great whole, more than an earthworm in a wide field.

The beautiful wood on Goat Island is full of flowers; many of the fairest love to do homage here. The Wake Robin and

1843
Ossoli

May Apple are in bloom now; the former, white, pink, green, purple, copying the rainbow of the fall, and fit to make a garland for its presiding deity when he walks the land, for they are of imperial size, and shaped like stones for a diadem. Of the May Apple, I did not raise one green tent without finding a flower beneath.

And now farewell, Niagara. I have seen thee, and I think all who come here must in some sort see thee; thou art not to be got rid of as easily as the stars. I will be here again beneath some flooding July moon and sun. Owing to the absence of light, I have seen the rainbow only two or three times by day; the lunar bow not at all. However, the imperial presence needs not its crown, though illustrated by it.

. . . . .

As I rode up to the neighborhood of the falls, a solemn awe imperceptibly stole over me, and the deep sound of the ever-hurrying rapids prepared my mind for the lofty emotions to be experienced. When I reached the hotel, I felt a strange indifference about seeing the aspiration of my life's hopes. I lounged about the rooms, read the stage bills upon the walls, looked over the register, and, finding the name of an acquaintance, sent to see if he was still there. What this hesitation arose from, I know not; perhaps it was a feeling of my unworthiness to enter this temple which nature has erected to its God.

At last, slowly and thoughtfully I walked down to the bridge leading to Goat Island, and when I stood upon this frail support, and saw a quarter of a mile of tumbling, rushing rapids, and heard their everlasting roar, my emotions overpowered me, a choaking sensation rose to my throat, a thrill rushed through my veins, "my blood ran rippling to my fingers' ends." This was the climax of the effect which the falls produced upon me — neither the American nor the British fall moved me as did these rapids. For the magnificence, the sublimity of the latter I was prepared by descriptions and paintings. When I arrived in sight of them I merely felt, "ah, yes, here is the fall, just as I have

seen it in a picture." When I arrived at the Terrapin bridge, I expected to be overwhelmed, to retire trembling from this giddy eminence, and gaze with unlimited wonder and awe upon the immense mass rolling on and on; but, somehow or other, I thought only of comparing the effect on my mind with what I had read and heard. I looked for a short time, and then with almost a feeling of disappointment, turned to go to the other points of view to see if I was not mistaken in not feeling any surpassing emotion at this sight. But from the foot of Biddle's stairs, and the middle of the river, and from below the table rock, it was still "barren, barren all." And, provoked with my stupidity in feeling most moved in the wrong place, I turned away to the hotel, determined to set off for Buffalo that afternoon. But the stage did not go, and, after nightfall, as there was a splendid moon, I went down to the bridge, and leaned over the parapet, where the boiling rapids came down in their might. It was grand, and it was also gorgeous; the yellow rays of the moon made the broken waves appear like auburn tresses twining around the black rocks. But they did not inspire me as before. I felt a foreboding of a mightier emotion to rise up and swallow all others, and I passed on to the terrapin bridge. Everything was changed, the misty apparition had taken off its many-colored crown which it had worn by day, and a bow of silvery white spanned its summit. The moonlight gave a poetical indefiniteness to the distant parts of the waters, and while the rapids were glancing in her beams, the river below the falls was black as night, save where the reflection of the sky gave it the appearance of a shield of blued steel. No gaping tourists loitered, eyeing with their glasses, or sketching on cards the hoary locks of the ancient river god. All tended to harmonize with the natural grandeur of the scene. I gazed long. I saw how here mutability and unchangeableness were united. I surveyed the conspiring waters rushing against the rocky ledge to overthrow it at one mad plunge, till, like toppling ambition, o'erleaping themselves, they fall on t'other

1843
Ossoli

1843 Ossoli

side, expanding into foam ere they reach the deep channel where they creep submissively away.

1843 Silliman

SILLIMAN, AUGUSTUS E. A gallop among American scenery; or, Sketches of American scenes and military adventure. N. Y.: D. Appleton. 1843. Pp. 148–154.

1844

1844 Lewis

LEWIS, GEORGE. Impressions of America and the American churches: from journal of the Rev. G. Lewis. Edinb.: Kennedy. 1845. Pp. 334–341.

The author was one of a deputation from the Free Church of Scotland to the United States. He was "impressed" with the Niagara as a frontier river and with the insignificance of man, as compared with the grandeur of the Falls.

1846 Raumer

RAUMER, FRIEDRICH LUDWIG GEORG VON. America, and the American people. Tr. by William W. Turner. N. Y.: J. and H. G. Langley. 1846. Pp. 453–456.

Personal observations written by a professor of history in the University of Berlin who was at Niagara Falls in July, 1844.

I could have shouted with exultation; and my excited spirit soared aloft, like the tones of an Eolian harp harmoniously blending with the thunders of this miracle of nature. Immersion in this sea of beauty seemed to renew the vigor and vivacity of early years; it was a fountain of rejuvenescence — such as the pressure of dry categories, could never set flowing. There was nothing frightful, horrible, oppressive, annihilating, or repulsive, — but the beauty of nature in her noblest manifestation and the most amazing variety. No painter could represent this world of *moving* wonders in full truth and beauty; nor can any description be successful. For if I dwell on the wondrous unity and harmony of all these phenomena, their multiplicity is lost sight of; if this last is made prominent, the former disappears in the fragile mosaic of a dry enumeration.

. . . . .

It is not one, nor two water-falls; it is a whole series of

View of the Falls of Niagara

Sketched by A. Ellicott, 1790; engraved by Thackara & Vallance

wonders, renewing and changing at every step, and presenting a world of incomparable beauties. 1846 Raumer

1846

MACKAY, ALEXANDER. The western world; or, Travels in the United States in 1846–1847: exhibiting them in their latest development, social, political and industrial. . . . 2d ed. Lond.: Richard Bentley. 1849. 3:116–131. 1846 Mackay

The author bears witness to the overwhelming power of the scene and the enduring impression which it made upon him. He gives a detailed description of Niagara by moonlight. His account, though rather long and serious, is appreciative withal.

1848

DIXON, JAMES. Personal narrative of a tour through a part of the United States and Canada: with notices of the history and institutions of Methodism in America. N. Y.: Lane and Scott. 1849. Pp. 110–124. 1848 Dixon

A good example of the reflective sort of appreciation of Niagara which expresses itself in philosophy and religion rather than detailed and matter-of-fact description of the points of interest.

. . . There is something perfectly awful in the idea of the undeviating uniformity of all the forces seen to be at work at this great fall.

We behold motion, calm, but rapid,— uninterrupted, irresistible, eternal,— with the feeling that this motion has been in progress for hundreds, for thousands, of years; for aught we know, from the beginning of time, or, at any rate, ever since the flood. We see force and power,— palpable, tangible, concentrated, and, to man, omnipotent,— always at work, and unwearied, silent, majestic, like the omnipotence of God. We contemplate a created sovereignty, a kind of rectoral glory, enthroned;— a power, concentrating itself at this point in lofty grandeur, as if to render itself visible,— then sweeping along, and, in regard to all within its sway, helpless in resistance; like the mighty stream of time, bearing the fate and destiny of nature and

1848
Dixon

empires into the abyss below, the *hades* of all created things. We follow the course of the waters, and see, at a prodigious depth, a frightful gulf, scooped out as if to embrace the descending flood, and conduct it to some new destiny;— as the present receives the past in its passage onward, and impels it by a new impulse, together with all it bears on its tide, to the mysterious future. We stretch our gaze over this yawning deep, and perceive that the water has changed its aspect altogether. It now has a milk-like appearance, and is tossed, agitated, whirled, infuriated,— heaving its bosom to an immense height, and sending forth its spray and mist to be arched by the rainbow, and painted by sunbeams with every variety of colour; thus imitating the progress of human events in reducing old, great, majestic, time-worn forms of power into chaos, and then handing them over to other agencies to receive some new form, to run in new channels, and push their way into an untried destiny.

Such were the thoughts which passed through my mind; but who can grasp, who can describe, the combined effect? We have no analogies in nature. These falls are alone in the universe; they stand in peerless majesty; nothing is like them. The sublimity consists in their combined majesty and beauty. Their grandeur is not in the slightest degree in harmony with that of the Alpine mountains, rugged heights, and overhanging rocks, covered with clouds, and lost in darkness. It is rather as if nature had sat in council with herself, to create a living embodiment of her utmost power, sovereign glory, irresistible force, rapid motion; and then throw around the representation of her visible symbol — instinct with the life of many, of all, elements — a covering of exquisite, of inexpressible, beauty.

There this living monument stands, a glorious emblem of the majesty of God! It has been looked upon with wonder next to adoration by a countless number of visitors; these have all received different impressions, in accordance with the structure of their nervous systems, the powers of vision, and the faculty of combination. Many have given their impressions to the

public; some in classic and eloquent, impassioned and poetic strains; some, again, in scientific and geological language;— but all have come short, all have failed. This attempt to convey the impressions of another soul, the feelings of another heart, is equally short of the truth, is equally a failure. Who can describe thunder? who can paint the rainbow? who can exhibit the ocean in language? who can grasp the infinite? God has left, in all his dominions and works, space for imagination. Everything has its mystery,— nothing its limits. Niagara stands a mystic creation, defying the admeasurements of the human intellect. But he welcomes all who approach to indulge the feelings of admiration, wonder, awe;— and by the eternal roar of his glorious music, he sends up sounds of adoration to God, and challenges for his Creator the homage of all hearts. 1848 Dixon

WHITMAN, WALT. November boughs. Phila.: D. McKay. 1888. P. 104. 1848 Whitman

Got in the cars and went to Niagara; went under the falls — saw the whirlpool and all the other sights.

This was in June, 1848.

PRENTICE, ARCHIBALD. A tour in the United States. Lond.: 1848. Pp. 73–74. 1848 Prentice

A brief appreciation by one who found at Niagara Falls, "calm, gentle, tranquil exceeding loveliness."

It takes some boldness to avow that I was less awestruck than tourists generally profess to be; but I was delighted with the exceeding beauty of the scene.

Close at hand the falling river was broken into millions of resplendent diamonds; farther off it was a perpendicular fall of snow; in the middle it was the rush of the green ocean wave into a chasm opened in the great deep; and again in the distance was the gentle snow-fall; all illuminated by a brilliant sun, and all gentle and lovely. There was no rage, no discord, no tumultuous chafings of the immense flood. There was the quietness as of the conscious possession of power; perfect harmony; perfect beauty.

1848 Prentice

I saw no death of the stream as it fell — no tremendous " ghost of spray and mist." No voices spoke to me from out the thundering water. There was the majestic, softened by the beautiful;— calm, gentle, tranquil exceeding loveliness.

1849

1849 Baird

BAIRD, ROBERT. Impressions and expressions of the West Indies and North America in 1849. Edinb. and Lond.: Blackwood and Sons. 1850. 2:79–95.

The author's purpose is best expressed in his own words. We quote:

I will not attempt any detailed description of the Falls, or of their concomitant rapids and whirlpool, but content myself with noting down such suggestions, as to the mode of seeing them, as may spare some after visitor a little of the unnecessary trouble I encountered myself, and aid him in making the best of his time: to which I will add one or two remarks as to those points which appeared to me to form the distinctive characteristics of the magnificent scene.

Of interest, from a psychological point of view, is his analysis of his feelings at the sight of the cataract.

The first few minutes of the contemplation was to me positively painful, and left an oppressiveness on my spirits for all the rest of the day. It was not that I was disappointed — *that* I could not say; and yet the cataracts were something very different from what I had conceived them to be. But the preconception and the reality were so totally unlike, that comparison of the one with the other was completely out of the question; and *that* reality was so great, that disappointment was equally precluded from my feelings. I felt oppressed, however, by the first view; and the companion who accompanied me acknowledged, as we sat together in the evening listening to the roar, that such also was his experience. It was with a feeling of relief that I turned away from the scene; and it was not till I had been at Niagara for some days, and had visited these glorious Falls

at all hours, and for hours together, that I felt from the contemplation of them that satisfaction (I cannot think of a better word) which I had anticipated. 1849 Baird

CHRISTMAS, H. Canada in 1849. Pictures of Canadian life: or, The emigrant churchman. By a pioneer of the wilderness. Edited by the Rev. H. Christmas. Lond.: Richard Bentley. 1850. 1:131–167. 1849 Christmas

The author saw everything apparently, but he writes unsatisfactorily. His account is typical of the style of the conservative Englishman, interested rather in recording his impressions of American manners and customs than in describing the Falls.

COOKE, HENRY. An excursion to Niagara and Canada. (Colburn's new mo. mag., 1849. 87:358–360.) 1849 Cooke

The author wandered about the Falls and river on foot. He had seen many cataracts in Europe but says "there is nothing on the whole continent, or I believe in the world, at all to be compared to Niagara. . . . What a pity it is the scenery above is not upon a grander scale!" He spent three days on the American side and "was delighted with Goat Island which is really one of the most charming wild spots I have anywhere seen."

ROBERTSON, WILLIAM PARISH. A visitor to Mexico, by the West India islands, Yucatan and United States, with observations and adventures by the way. Lond.: Simpkin, Marshall and Co. 1853. 2:437–441. 1849 Robertson

The author visited the Falls with a party of Mexicans in the autumn of 1849. His account is rather bald. "I came too late," he writes, "to say anything which could be new or interesting."

(ROSE, A.) The emigrant churchman in Canada. Lond.: Rev. Henry Christmas. 1849. 1:131–167. 1849 Rose

The author was impressed with the "serene loveliness" of the scene and describes in some detail various features of his trip around the Falls.

THORNTON, JOHN, *Major*. Diary of a tour through the northern states of the Union and Canada. Lond.: 1850. Pp. 26–36. 1849 Thornton

Thornton came to see America and particularly the Falls. He describes them as he found them in August, 1849.

UNONIUS, GUSTAF. Minnen frán en Sjuttonárig vistelse i Nordvestra Amerika. Andra Upplagan. Upsala: W. Schultz. 1862. Pt. II, pp. 405–412. 1849 Unonius

1849–50 Stuart-Wortley — STUART-WORTLEY, *Lady* EMMELINE CHARLOTTE ELIZABETH (MANNERS). Travels in the United States . . . during 1849 and 1850. Lond.: Bentley. 1851. Pp. 18–30.

Before I came here, I erroneously supposed that one should be immensely struck, and overpowered, and enchanted at first, but that afterwards there would be a certain degree of monotony attached to that unvarying sublimity, which I wrongly believed to be the great characteristic of Niagara. But, how miserably did I do it injustice! Perhaps the most peculiar and transcendent attribute of this matchless cataract, is its almost endless variety. The innumerable diversities of its appearance, the continual countless rapid alterations in its aspect; in short, the perpetually varying phases which it displays, are indeed wondrous and truly indescribable. This is a great deal owing to the enormous volumes of spray which are almost incessantly shifting and changing their forms like the clouds above. Niagara, indeed, has its own clouds, and they not only give it the great charm and interest of an ever-beautiful and exquisite variety, but also environ it with a lovely and bewildering atmosphere of mystery, which seems the very crown of its manifold perfections and glories.

Niagara has its changes like the sea, and in its lesser space circumscribed, they seem fully as comprehensive and multitudinous. I have dwelt long on this, because I do not remember to have seen this mighty and transcendent feature of Niagara particularly noticed in any of the descriptions I have ever read of it, and it has most especially delighted and astonished me.

We were so very fortunate as to have a tremendous thunder-storm here on Tuesday night, and it may be guessed what a tremendous thunder-storm *must* be here! The heavens seemed literally opening just over the great cataracts, and the intensely vivid lightning, brighter than day, lit up the giant Falls, and seemed mixed and mingling with the dazzling mountains of spray, which then looked more beautiful and beatific than ever. It was

a wild windy night, as if all the elements were revelling together in a stormy chaotic carnival of their own, till it really presented altogether a scene almost too awfully magnificent. 1849–50 Stuart-Wortley

The deafening roar of the crashing thunder was yet louder than the roar of the cataract, and completely appeared to drown it while it lasted; but the moment the stormy roll of the thunder died away, it was grand indeed to hear again the imposing, unceasing sound of Niagara — like the voice of a giant conqueror uttering a stunning but stately cry of victory. Then soon the bellowing thunder broke forth again, fiercer and louder than before; and oh, the lightning! it seemed like a white-winged sunbreak when it blazed on the snowy glare of the ever-foaming cataracts.

I hardly ever saw before such dazzling lightning; and those reverberating peals of Niagara — out-voicing thunder were truly terrific, and appeared quite close. Heaven and earth seemed shouting to one another in those sublime and stupendous voices; and what a glorious hymn they sang between them! At first, the lightning was only like summer flashes, and it kept glancing round the maddened waters as if playing with them and defying them in sport; but, after a little while, a fearful flash, updarted really like a sudden sun, behind the great Horse Shoe Fall, and the whole blazed out into almost unendurable light in a moment. The storm continued during the whole night.

. . . . .

One becomes here, indeed, utterly Niagarized; and, the great cataract goes sounding through all one's soul, and heart, and mind, commingling with all one's ideas and impressions, and uniting itself with all one's innermost feelings and fancies. The sounds of the Fall vary as much as their aspect: sometimes very hollow, at other times solemn and full-toned, like an host of organs uttering out their grand voices together; and sometimes, as I heard it said, the other day, with a rolling kettle-drum, gong-like sound, in addition — as if it were a temporary and accidental accompaniment to their majestic oceanic roar.

1850

1850 Bigsby

BIGSBY, JOHN J. The shoe and canoe. . . . Lond.: Chapman and Hall. 1850. 2:1–34.

A delightful, gossipy account of the general features of the Falls and the sayings and doings of the party with whom the author visited them.

1850 Bremer

BREMER, FREDERIKA. The homes of the new world. Lond.: Hall, Virtue and Co. 1853. 2:194–202.

It makes a grand and joyful impression, but has nothing in it which astonishes or strikes the beholder. As you go toward the great fall, which is on the Canada side, you see a broad mass of water which falls perpendicularly from a plane in a horseshoe or crescent form. One might say that the water comes from an open embrace. The water calm and clear, and of the most beautiful smaragdus-green colour, arches itself over the precipice that breaks it, and it is then that the fury and wild power of the fall first break forth, but even here rather majestically than furiously. Trenton is a young hero, drunken with youthful life and old sherry, which, in blind audacity, rushes forth on its career, violent and terrible. Niagara is a goddess, calm and majestic even in the exercise of her highest power. She is mighty, but not violent. She is calm, and leaves the spectators so. She has grand, quiet thoughts, and calls forth such in those who are able to understand her. She does not strike with astonishment, but she commands and fascinates by her clear, sublime beauty. One sits by her knee and still can hear one's own thoughts and the words of others, yes, even the falling water-drops from the green trees which her waters have besprinkled. She is too great to wish to silence, to wish to rule, excepting by her spiritual power. She is — ah, she is what human beings are not, and which, if they were, would make them god-like.

But those many thousand people who come hither every year — it is said that the place is visited by 60,000 persons annually — must they not grow a little greater and better by seeing

this greatness, and reflecting themselves in it? I rejoice that so many people see Niagara in the year. 1850 Bremer

. . . . .

Trollhätten, in Sweden, has neither the mass of waters of Niagara nor its majesty, but it has more history, more romantic life. Niagara is a grand scene, a sublime action. Trollhätten is a series of scenes and actions. Niagara is a hymn. Trollhätten is a Vala-song.

That which most surprised me in Niagara, because I had not expected it, and that which charmed me every day, was, besides the smaragdus-green colour of the water, the play of the rainbows over and around the fall, according as the sunbeams fell, or as the wind bore the water-spirit's movable pyramid. This formed a succession of brilliant scenes, continually varying and enchantingly beautiful. There is a something about it which charms and depresses me at the same time, because there is a something in it which I wish to understand better. I feel that Niagara has more to say to me than it has yet said, or more than I have yet comprehended; and nothing can perfectly delight me until it has told me its innermost thought. . . .

We have been here for three days, and shall remain yet two or three days longer. In the mornings I see the fall from the American shore, that is to say, from the New York side, when the sun, in its ascent, throws hundreds of beautiful bridges over the cloud of spray; in the afternoon and evening it ought to be contemplated from the Canadian shore, when the sun descends on the British side. In the forenoon I bathe in the stream, in the so-called "Mammoth" stream-bath, where the river rushes with such impetuosity into the bath-house that one can with difficulty stand against it. It is very refreshing. In the afternoon, directly after dinner, I sit with my young friends in the piazza outside our room, and see the stream rushing by, and listen to its music. I often stand for a long time upon some one of the little bridges over the stream, merely to inhale the fragrance of

1850
Bremer

the water; for the water here has the most delightful freshness, that I can compare to nothing with which I am acquainted. But it feels like the spirit of a delicious, immortal youth. Yes, here it seems to me as if one might become young again in body and in soul.

. . . . .

Last evening, James and I . . . went across to the Canadian side, and walked backward and forward as the sun descended. At every new bend or movement of that misty water-spirit it presented new forms of light. Still were the rainbows arched, like the airy bridge of Bifrost, in the old Scandinavian mythology, the one over the other; still glowed the light like kisses of fire, brilliant with prismatic colours, upon the green waters in the abyss; it was an unceasing festival of light, perpetually changing and astonishingly beautiful. What life, what variations between earth and heaven! And as the sun sank, those splendid bridges arched themselves higher and higher aloft in the ascending mist. The pyramidal light red cloud floated in the pale blue heaven above the green Niagara, and around it; on the lofty shores stood the forest in its brilliant autumnal pomp, such as is only seen in the forests of America, and all was silent and still excepting the thunder of the waterfall, to the voice of which all things seemed to be listening.

September 9th. In the morning of time, before man was yet created, Nature was alone with her Creator. The warmth of His love, the light of His eye awoke her to the consciousness of life; her heart throbbed with love for Him of whose life of love she had partaken, and she longed to present Him with an offering, to pour out her feeling, her life, for Him who gave it. She was young and warm with the fullness of primeval life; but she felt, nevertheless, her weakness in comparison with His power. What could she give to Him from whom she received everything? Her heart swelled with love and pain, with infinite longing, with the fulness of infinite life, swelled and swelled till it overflowed in — Niagara. And the spirit of thanksgiving arose as the smoke of

an eternal sacrifice from the depth of the water toward heaven. The Lord of heaven saw it, and His spirit embraced the spirit of Nature with rainbows of light, with kisses of brilliant fire in an eternal betrothal. 1850 Bremer

Thus was it in the morning of the earth's life. Thus we behold it to this day. Still we behold to-day the spirit of nature ascend from Niagara toward heaven with the offering of its life, as an unspoken yearning and song of praise; and still, to-day it is embraced by the light and flames of heaven, as by divine love.

> Niagara is the betrothal of earth's life
> With the heavenly life.
> That has Niagara told me to-day.
> And now can I leave Niagara. She has
> Told me her word of primeval being.

September 10th, in the morning. . . . I have not told you about the different scenes of life at Niagara, of the steamboat, the "Maid of the Mist," which advances up to the very fall till it is wetted with its spray, and then only turns back; nor of my botanical rambles around Iris island; nor of the Indians whom one yet meets roaming about here; nor of the great iron bridge which, strong and light at the same time, has been thrown across the stream a little below the fall; nor of many other remarkable things here; but all these are petty in comparison with that great waterfall, and that has been to me the essential thing. The Indians who live around Niagara belong to the Seneca tribe. As this is the season when the men are all out on their hunting grounds, I saw merely some squaws, who offered their work for sale. This consists of embroidery done by hand, of flowers and animals, drawn and finished in a childish manner, but yet well done with dyed fibre of porcupine quills, small mats, baskets, moccasins, and children's rattles, made of a fragrant kind of grass. There are many shops around here full of their work, which is sold at a high price.

. . . . .

1850
Bremer

I have now taken my farewell look of the great scene and sight. The green colour of the water, its inexpressively delightful, living odour, charms me as much as ever. I shall always, in recalling it, think of the fountains of eternal youth. I am satisfied to leave it, but would wish to come once more to see the fall in its winter magnificence, when it crowns itself with flowers and fruits, and a thousand fantastic adornments of ice; when the full moon shines and spans it with the lunar bow. We shall see! But I am nevertheless infinitely thankful to have seen Niagara. Its quiet grandeur and power, its colour, its spray, the rainbow's sport in that white, cloudy figure — all this is and will remain a clear, living image in my soul. And that eternal fulness of nature's heart here — ah! that the human heart might resemble it, perpetually filled anew, perpetually flowing, never weary, never scanty, never dried up!

Some pages of poetic prose by a gifted writer.

1850

Recollections of a ramble from Sydney to Southampton, via South America, the West Indies, the United States, and Niagara. Lond.: R. Bentley. 1851. Pp. 320–330.

A flying visit made in the early spring. He gives a thrilling account of the ferry trip across the river amid the floating ice.

1851

1851
Ampere

AMPERE, JEAN JACQUES ANTOINE. Promenade en Amérique. . . . Paris: Michel Lévy frères. 1855. 1:162–170.

An enthusiastic and interesting account of a visit made in October, 1851. The author saw everything apparently and touches on various aspects of the Falls.

1851
Busch

BUSCH, MORITZ. Wanderungen zwischen Hudson und Mississippi, 1851 und 1852. Stuttgart und Tubingen. 1854. 2:121.

Remarks on the Falls in winter and the short distance at which the sound can be heard.

1851
Curtis

CURTIS, GEORGE WILLIAM. Lotus-eating. A summer book. N. Y.: Harper Bros. 1852. Pp. 75–102.

The Rapids before Niagara are not of water only. The Cataract is the centre of a vortex of travel — a maelstrom which you scarcely suspect until you are swimming round in its intense swiftness, and feel that you are drawn nearer and closer, every moment, to an awful and unimagined Presence. 1851 Curtis

. . . . .

. . . Within a certain circumference every body is Niagarized, and flies in a frenzy to the centre as filings to the magnet. Before the train stopped, and while I fancied that we were slackening speed for a way-station — I, listening the while to the pleasant music of words, that weaned my hearing from any roar of waters — a crowd of men leaped from the cars, and ran like thieves, lovers, soldiers, or what you will, to the "Cataract," as the conductor said. I looked upon them at once as a select party of poets, overwhelmed by the enthusiastic desire to see the Falls. It was an error: they were "knowing ones," intent upon the first choice of rooms at the "Cataract House." I followed them, and found a *queue*, as at the box-office of the opera in Paris — a long train of travellers waiting to enter their names. Not one could have a room yet, (it was ten o'clock,) but at half-past two every body was going away, and then every body could be accommodated. . . .

Disappointment in Niagara seems to be affected, or childish. Your fancies may be very different, but the regal reality sweeps them away like weeds and dreams. You may have nourished some impossible idea of one ocean pouring itself over a precipice into another. But it was a wild whim of inexperience, and is in a moment forgotten. If, standing upon the bridge as you cross to Goat Island, you can watch the wild sweep and swirl of the waters around the wooded point above, dashing, swelling and raging, but awful from the inevitable and resistless rush, and not feel that your fancy of a sea is paled by the chaos of wild water that tumbles toward you, then you are a child, and the forms of your thought are not precise enough for the profoundest satisfaction in great natural spectacles.

1851
Curtis

Over that bridge how slowly you will walk, and how silently, gazing in awe at the tempestuous sweep of the rapids, and glancing with wonder at the faint cloud of spray over the American Fall. As the sense of grandeur and beauty subdues your mind, you will still move quietly onward, pausing a moment, leaning a moment on the railing, closing your eyes to hear only Niagara, and ever, as a child says its prayers in a time of danger, slowly, and with strange slowness, repeating to yourself, "Niagara! Niagara!"

For although you have not yet seen the Cataract, you feel that nothing else can be the crisis of this excitement. Were you suddenly placed blindfolded where you stand, and your eyes were unbandaged, and you were asked, "What shall be the result of all this?" the answer would accompany the question, "Niagara!"

Yet marvellous calmness still waits upon intense feeling. "It was odd," wrote Sterling to a friend, "to be curiously studying the figures on the doctor's waistcoat, while my life, as I thought, was bleeding from my lips." We must still sport with our emotions. Some philosopher will die, his last breath sparkling from his lips in a pun. Some fair and fated Lady Jane Grey will span her slight neck with her delicate fingers, and smile to the headsman that his task is easy. And we, with kindred feeling, turn aside into the shop of Indian curiosities and play with Niagara, treating it as a jester, as a Bayadere, to await our pleasure.

Then, through the woods on Goat Island — solemn and stately woods — how slowly you will walk, again, and how silently! Ten years ago, your friend carved his name upon some tree there, and Niagara must now wait until he finds it, swollen and shapeless with time. You saunter on. It is not a sunny day. It is cloudy, but the light is moist and rich, and when you emerge upon the quiet green path that skirts the English Rapids, the sense of life in the waters — the water as a symbol of life and human passion — fills your mind. Certainly no other water in the world is watched with such anxiety, with such sympathy.

The helplessness of its frenzied sweep saddens your heart. It is dark, fateful, foreboding. At times, as if a wild despair had seized it and rent it, it seethes, and struggles, and dashes foam-like into the air. Not with kindred passion do you regard it, but sadly, with folded hands of resignation, as you watch the death struggles of a hero. It sweeps away as you look, dark, and cold, and curling, and the seething you saw, before your thought is shaped, is an eddy of foam in the Niagara River below. 1851 Curtis

As yet you have not seen the Fall. You are coming with its waters, and are at its level. But groups of persons, sitting upon yonder point, which we see through the trees, are looking at the Cataract. We do not pause for them; we run now, down the path, along the bridges, into the Tower, and lean far over where the spray cools our faces. The living water of the rapids moves to its fall, as if torpid with terror; and the river that we saw, in one vast volume now pours over the parapet, and makes Niagara. It is not all stricken into foam as it falls, but the densest mass is smooth, and almost of livid green.

Yet, even as it plunges, see how curls of spray exude from the very substance of the mass, airy, sparkling and wreathing into mist — emblems of the water's resurrection into summer clouds. Looking over into the abyss, we behold nothing below, we hear only a slow, constant thunder; and, bewildered in the mist, dream that the Cataract has cloven the earth to its centre, and that, pouring its waters into the fervent inner heat, they hiss into spray, and overhang the fated Fall, the sweat of its agony. . . .

Nature has her partialities for places as well as persons. . . . Here at Niagara she enamels the cliffs with delicate verdure, and the luminous gloom of the wood upon Goat Island invites to meditation with cathedral solemnity.

Nothing struck me more than the ease of access to the very verge of the cataract. Upon the narrow point between the large and small American falls you may sit upon the soft bank on a tranquil afternoon, dabbling your feet in the swiftly slipping

1851
Curtis

water, reading the most dreamy of romances, and soothed by the huge roar, as if you were the vice-gerent of the prophet, and the flow of the cool, smooth river but the constant caressing of troops of slaves, and the roar of the Cataract but hushed voices singing their lord to sleep.

But if in your reading you pause, or if the low ripple of talk subsides, in which your soul was laved, as your frame in the gurgling freshness of woodstreams, and your eyes are left charmed upon the current — or if your dream dissolves and you behold the water, its own fascination is not less than that of the romance. It flows so tranquilly, is so unimpatient of the mighty plunge, that it woos and woos you to lay your head upon its breast and slide into dreamless sleep. . . .

Niagara has but one interest, and that absorbs all attention. The country around is entirely level, and covered with woods and grain fields. It is very thinly populated; civilization seems to have made small inroad upon the primeval grandeur of the spot. Standing upon the western end of Goat Island and looking up the stream the wooded banks stare back upon you as in a savage silence of folded arms and scornful eyes. They are not fair woods, but dark forests. They smite you only with a sense of magnificent space, as I fancy the impression of Rocky Mountain scenery, but which is akin to that of chaos.

. . . . .

The beauty of Niagara is in its immediate neighborhood. It is upon Goat Island — upon the cliffs over which hangs the greenest verdure — in the trees that lean out and against the Rapids, as if the forest were enamored of the waters, and which overhang and dip, suffering their youngest and softest leaves to thrill in the trembling frenzy of the touch of Niagara. It is in the vivid contrast of the repose of lofty trees and the whirl of a living river — and in the contrast, more singular and subtle, of twinkling, shimmering leaves, and the same magnificent madness. It is in the profuse and splendid play of colors in and around the Cataract, and in the thousand evanescent fancies

which wreathe its image in the mind as the sparkling vapor floats, a rainbow, around the reality. It is in the flowers that grow quietly along the edges of the precipices, to the slightest of which one drop of the clouds of spray that curl from the seething abyss is the sufficient elixir of a long and lovely life. 1851 Curtis

Yet — for we must look the Alpine comparison which is suggested to every one who knows Switzerland, fairly in the face — the Alps are more terrible than Niagara. The movement and roar of the Cataract, and the facility of approach to the very plunge, relieve the crushing sense of awfulness which the silent, inaccessible, deadly solitudes of the high Alps inspire. . . .

Besides, where trees grow, there human sympathy lingers. Doubtless it is the supreme beauty of the edges of Niagara, which often causes travellers to fancy that they are disappointed, as if in Semiramis they should see more of the woman than of the queen. . . .

The little steamer leaves the shore by the suspension bridge, and, gliding with effort into the current of the river, you remember that there is the Cataract before and the whirlpool behind, and sheer rocky precipices on each side. But there is only gay gossip and pleasant wonder all around you, the morning is mild, and the Falls flash like a plunge of white flame. Slowly, slowly, tugs the little boat against the stream. She hugs the shore, rocky-hearted, stiff, straight, prim old puritan of a shore that it is, although it is wreathed and crowned with graceful foliage.

Presently comes a puff of cool spray. Is it a threat, a kiss, or a warning from our terrible bourne? The fussy little captain exhorts everybody to wrap in a water-proof cloak and cap; we shall else be soaked through and through, as we were never soaked by shower before. But some of us, beautiful daughters of a mother famously fair, love our looks, and would fain enjoy every thing without making ourselves less lovely.

"Pooh, pooh!" insists our captain, "I wouldn't give three cents for them 'ere bunnets, (our choice travelling hats!) if they once get wet."

1851
Curtis

So we consent to cloaks, but we positively decline India-rubber caps, especially after an advance to six cents by a gallant friend upon the captain's bid for our "bunnets." The men must shift for themselves. Here we are in the roar and the rush and the spray. Whew! it drives, it sweeps, and the steady thunder of the Cataract booms, cramming the air with sound. Only a few of us hold the upper deck. Nor are we, who have no mantles, all unprotected, for shawls wont to protect flowers from the summer wind, now shield us from the spray of Niagara.

We sweep along upon our leaf, which quivers and skims the foam — sweep straight into the blinding white, thick, suffocating mist of the Cataract, strain our eyes, as we gasp, for the curve of the Fall, for the parapet above, and in a sudden break of the cloud, through which breathes cold the very air of the rush of waters, we catch a glorious glimpse of a calm ocean pouring white and resistless from the blue sky above into the white clouds below, and behold the very image of that Mind's process whose might

——"Moves on
His undisturbed affairs."

I glance backward upon the deck, which is raked by the scudding gusts of spray, and see a line of wet men crouching together, like a group of Esquimaux, with their faces upturned toward the Fall. They sit motionless, and staring, and appalled, like a troop in Dante's Inferno. But straight before us — good God! pilot, close under the bow there, looming through the mist! Are you blind? are you mad? or does the Cataract mock our feeble power, and will claim its victims? A black rock, ambushed in the surge and spray, lowers before us. We are driving straight upon it — we all see it, but we do not speak. We fancy that the boat will not obey — that the due fate shall reward this terrific trifling. Straight before us, a boat's length away, and lo! swerving with the current around the rock, on and farther, with felicitous daring, the little "Maid of the Mist" dances up to the very foot of the Falls, wrapping herself saucily

in the rainbow robe of its own mist. There we tremble, in perfect security, mocking with our little Maid the might of Niagara. For man is the magician, and as he plants his foot upon the neck of mountains, and passes the awful Alps, safely as the Israelites through the divided sea, so he dips his hand into Niagara, and gathering a few drops from its waters, educes a force from Niagara itself, by which he confronts and defies it. The very water which as steam was moving us to the Cataract, had plunged over it as spray a few hours before. 1851 Curtis

— Or go, some bright morning down the Biddle staircase, and creeping along under the cliff, change your dress at the little house by the separate sheet of the American Fall. The change made, we shall reappear like exhausted firemen, or Swampscot fishermen. Some of us will not insist upon our "bunnets" but will lay them aside and join the dilapidated firemen and fishermen outside the house, as Bloomerized Undines, mermaids, or naiads. A few descending steps of rock, and we have reached the perpendicular wooden staircase that leads under the Fall. Do not stop — do not pause to look affrighted down into that whirring cauldron of cold mist, where the winds dart, blinding, in arrowy gusts. Now we see the platform across the bottom — now a cloud of mist blots it out. And it roars so!

Come, Fishermen, Mermaids, Naiads, Firemen and Undine, down! down! Cling to the railing! Lean on me! Thou gossamer blossom which the softest summer zephyr would thrill, whither will these mad gales beneath the Cataract whirl thee! We are here upon the narrow platform; it is railed upon each side, and the drops dash like sleet, like acute hail, against our faces. The swift sweep of the water across the floor would slide us also into the yawning gulf beyond, but clinging with our hands, we move securely as in calm airs. And now look up, for you stand directly beneath the arching water, directly under the fall. The rock is hollowed, and the round pebbles on the ground rush and rattle with the sliding water as on the sea-beach. You leave the platform, you climb between two rocks, and sliding

1851 Curtis

along a staging, unstable almost as the water, yet quite firm enough, you stand directly upon the rocks, and Niagara plunges and tumbles above and around you.

There at sunset, and only there, you may see three circular rainbows, one within another. For Niagara has unimagined boons for her lovers — rewards of beauty so profound that she enjoins silence as the proof of fidelity.

Returning, there is an overhanging shelf of rock, and there, except that it is cold and wet, you sit secluded from the spray. It is a lonely cave, curtained from the sun by the Cataract, forever. And if still your daring is untamed, you may climb over slippery rocks in the blinding mist and the deafening roar, and feel yourself as far under the Great American Fall as human foot may venture.

A charming description of an August visit.

1851 Duncan

(DUNCAN, *Mrs.* M. G. LUNDIE.) America as I found it. Lond.: Nisbet. 1852. Pp. 365–380.

The author was at the Falls in Indian summer and, apparently, in sympathetic mood. She writes pleasantly of the hermit of Niagara, the recession of the Falls and the reflections on eternity which were inspired by the cataract. Her impression of the Falls is interesting. "It may sound strange," she writes, "to say that, after the rapid, the fall itself seemed a *helpless* thing. When it reaches the edge of the precipice, what can the torrent do but fall! It must go down! The rapid looks like a thing of life. It seems possessed of volition. The fall, like other falling things, tumbles into the boiling pool below, because it must. How can it avoid it?

"Nay — more strange! I have seen smaller cascades which seemed to have more a will of their own than has this mighty Niagara."

1852

1852 Marjoribanks

MARJORIBANKS, ALEXANDER. Travels in South and North America. Lond.: Simpkin, Marshall, and Co. 1853. Pp. 266–275.

1852 Ticknor

TICKNOR, GEORGE. Life, letters, and journals of George Ticknor. . . . 12th ed. Bost.: Houghton, Mifflin. 1:386. 2:221, 225, 277, 281.

The record of visits made in 1827, 1845, and 1852. Especially interesting are the letters to G. T. Curtis under date of July 23, 1845, and July 29, 1852, from which we quote. 1852 Ticknor

There — the other side of the river — we found Ole Bull and Egidius, his shadow, which seems in no likelihood to grow less. Of course we had a concert, and there was much visiting of wonders, and much enjoyment of lunar bows, and walks by moonlight on Goat Island, and adventurous rowing up to the foot of the falls. So passed three days.

Then we all came over here, where there is a very good, quiet house; and right before our windows and along the piazzas, where we chiefly live, is, according to my notion, the finest view of the two falls united. . . . Tomorrow, having completed three days on this side of the river, and pretty much used it up, we propose to remove to the other side, where we shall *bivouac* a longer or shorter time according to our humors, the fates, the sisters three, and such odd branches of learning.

The finest thing we have seen yet — and one of the grandest I ever saw — was a thunder-storm among the waters, as it seemed to be, the other night, which lighted up the two cascades, as seen from our piazzas, with most magnificent effect. They had a spectral look, as they came out of the darkness and were again swallowed up in it, that defies all description and all imagination.

. . . . .

I received, some days ago, your note written at Newport. We were then on the other [American] side of the river, where we stayed ten days, our rooms — or at least the balcony before them — overhanging the Rapids, right opposite Goat Island, . . . making the island our great resort, seeing the sunset there daily, and passing two evenings of superb moonlight there. Five days ago we came over here, and established ourselves in a neat, cheerful little cottage, with a large garden before it; the only thing there is between us and the excellent hotel where we get our meals. We have it all to ourselves, and live in great quiet, with

1852 Ticknor

the awful grandeur of the Falls before us whenever we lift our eyes, and their solemn roar forever in our ears. . . .

Last night Frankenstein, a painter from Ohio,— whom we had known before,— took us in a boat, and rowed us about for near an hour. Nobody has done such things before; not because they are dangerous, but because no eye for picturesque effect had ever detected its power. The moon was nearly full, and I cannot describe the awful solemnity, magnificence, and in one instance preternatural gorgeous glories, of the scene. We went quite near the American Falls, and when we emerged from the shade of the grim shores, and the moon began to illumine the edge of the waters above us, as they plunged down, there was a quivering mass of molten silver, that ran along the whole mighty flood of the waters as they rushed over, that was a thing of inconceivable brilliancy. . . .

1852 Sullivan

SULLIVAN, *Sir* EDWARD ROBERT. Rambles and scrambles in North and South America. Lond.: Bentley. 1852. Pp. 42–45.

Nothing but actual seeing and hearing can impress upon the imagination the mysterious bewilderment caused by the thundering roar of the enormous body of falling water.

. . . . .

It is as impossible to describe Niagara as to describe an avalanche, or anything else where you have to give the idea *noise* and *motion* besides its other glories.

I am never giddy on precipices, and even whilst chamois hunting in Switzerland, where I had to cross the most ticklish passes, never felt disposed to try an aeronautic leap; but sitting with my feet dangling from the Table Rock, and gazing into the abyss below, I more than once, like Lear, felt,—

> "I'll look no more,
> Lest my brain turn, and the deficient sight
> Topple down headlong."

. . . . .

1852 Patten

PATTEN, EDMUND. A glimpse at the United States and the northern states of America, with the Canadas, comprising their rivers, lakes and

falls during the autumn of 1852. . . . Lond.: Effingham Wilson. 1853. Pp. 91–96. 1852 Patten

The bulk of the account consists of quotation from Chateaubriand.

STRICKLAND, AGNES, *ed.* Twenty-seven years in Canada west; or, The experience of an early settler. By Major Strickland. Lond.: R. Bentley. 1853. 2:247–258. 1852 Strickland

Description, information, Niagaraiana.

PULSZKY, FRANCIS A. *and* THERESA W. White, red, black; sketches of society in the United States during the visit of their guest (Kossuth). Lond.: Trüebner. 1853. 3:112–127. 1852 Pulszky

The authors accompanied the Kossuths on their trip through the United States. Their book is compiled from notes kept by Mrs. Pulszky. It appears that they visited the Falls repeatedly. The cataract and various other attractions are duly described. We quote: "The scenery contains but two great features: the waters and the rocks; yet both are mighty, and their different combination presents a magnificent succession of sublime and idyllic sites."

1853

SINCLAIR, JOHN. Sketches of old times and distant places. Lond.: Murray. 1875. Pp. 244–255. 1853 Sinclair

A record of a visit made in September, 1853, by the Archdeacon of Middlesex and Vicar of Kensington.

BUNN, ALFRED. Old England and New England. Lond.: Bentley. 1853. 1:302–310. 1853 Bunn

As in the case of many another traveller, the rapids struck the author "with as much awe and wonder as even the abyss itself into which they eventually roll. . . ."

BENWELL, J. An Englishman's travels in America, with observations. Lond.: Goodwin. 1853. Pp. 45–47. 1853 Benwell

The writer was impressed not so much by the height of the Falls as with their immense body of water. According to his testimony, "At night the distant moan of Niagara Falls was audible" in Buffalo.

1853–1854

EVEREST, ROBERT. A journey through the United States and part of Canada. Lond.: John Chapman. 1855. P. 40. 1853–54 Everest

Just a paragraph or two expressing the author's disappointment in the Falls and their surroundings.

1854

1854 Pfeiffer

PFEIFFER, IDA REYER. A lady's second journey round the world. Lond.: Longman, Brown, Green, and Longmans. 1855. 2:337–344.

An enthusiastic account of an August visit.

This was a day never to be forgotten in the annals of my life — one of those which brilliantly rewarded me for all the toils and hardships by which they were purchased; for on this day I beheld one of the most sublime and wonderful scenes of God's beautiful world — the falls of Niagara! What the eye sees, what the soul feels, at this spectacle, can never be described: painter and poet would despair of success in such an attempt. Did a man meet his mortal enemy on this spot, he must at once forgive him; and should one who has doubted of the existence of God come to this, one of the noblest of His altars, he must, I think, return converted and tranquilized. Oh! that I could have shared with all my friends, with all mankind, the emotions awakened by this wonder of creation.

1854 Shaw

SHAW, JOHN. A ramble through the United States, Canada, and the West Indies. Lond.: J. F. Hope. 1856. Pp. 32–36.

The author visited Niagara in September, 1854, and in addition to his description of the fall of water, says of the plant life he observed, "In making a botanical excursion in the locality of the great falls I observed the Genus Verbascum and Gentiana, and several other beautiful plants, foreigners to me, and very near to the grand crash of waters. . . . In botanizing further, I observed among trees the following, Leather-wood, Butter-nut, Slippery elm, Hickory, Button-wood, Vine, Stramonium.

"Here the cedar tree grew in such profusion as to form a wood of itself. I thought if some of our nursery-men, who sell these trees at a good price, were here, how surprised they would have been."

1854 Baxter

BAXTER, W. E. America and the Americans. Lond.: Routledge. 1855. Pp. 223–226.

Few people know how beautiful the scenery is at these Falls, apart altogether from the water. The deep defile, the steep cliffs, the pine woods, the thickets of cedar and acaicia, the villas

and hotels themselves form a landscape lovely as the gorgeous creations of Salvator Rosa. 1854 Baxter

MANSFIELD, LEWIS W. *and* HAMMOND, SAMUEL H. Country margins and rambles of a journalist. N. Y.: J. C. Denby; Bost.: Phillips, Sampson and Co. 1855. Pp. 278–281. 1854 Mansfield

A short and sympathetic essay calling attention to the many phases of the Falls, their unrivalled beauty, and the probability that they will ultimately "be compelled to become utilitarian and perform an active part in the great drama of life."

FERGUSON, WILLIAM. America by river and rail; or, Notes by the way on the New World and its people. Lond.: James Nisbet. 1856. Pp. 441–458. 1854 Ferguson

. . . The road to the Clifton-house is along the edge of the ravine, so that we look down on the river.

. . . Presently we got a glimpse of the falls, and held our breaths. It is — it is Niagara, we felt. By and by, the road makes a turn, we issue from among some brushwood, and both falls are full before us, about half a mile off. The scene is perfectly beautiful, and very grand. But it does not strike you as so grand at first. You only think that it is beautiful. It is not till you have gazed and gazed, again and again, that you begin to understand how grand it is. There are, as every one knows, two falls. The river above makes a bend, and right in the middle is Goat-island. The Great Horseshoe, or Canada fall, is in front; the American fall pours in at the side. This latter is the highest, but the other is by far the finest. In the American fall, the water has a pale-green tinge; in the Horseshoe fall, it is a beautiful deep, clear green. It comes over in an immense body,— looking like molten emerald; but long ere it gets half-way down, it is dashed into a sheet of frothy spray, as white as driven snow; and so it falls on the rocks below. Constantly, from the boiling whirl of waters, chafed among the huge rock-masses which are heaped up at the bottom of the fall, a light white cloud of spray rises, and hovers over the fall in a thousand varying shapes. You are never tired of looking and listening;

1854
Ferguson

and on, on, on, the flood pours, in undisturbed majesty. This is my impression of Niagara from a distance. . . .

Sabbath, June 24.— I rose at eight, and looked out. It was raining in torrents, and evidently had been for some time. Streams, of no inconsiderable size, were pouring down the road, in front of the house; and when I went down stairs, I found the walks in the beautiful garden behind filled with gushing water, which poured over the terraced steps in miniature cascades, and threatened to flood the lower part of the house, as some of the upper part had already been by defects in the roof. Looking, however, from my window, which commands both falls, I thought the view enhanced by the pouring rain. There was a mist, which became a magnifying medium. The falls looked grander than they did last night, and the din sounded louder. The banks above are of red earth, and the water running in from them tinged the cataract red for a little way from the edge. But in the middle, it was emerald as before. The American fall seemed more discoloured. Many an impromptu waterfall had been called into existence by the rain, and poured each its independent cascade over the cliffs into the huge cauldron below. It was curious to see how long their discoloured waters moved down in-shore, unmingled with the green depths in the centre; but as the rain continued, the discolouration increased, till, towards evening, it had reached nearly the whole body of the river.

. . . . .

The Horseshoe fall is divided into two by a rock near the American shore, or more correctly, near the shore of Goat-island, and a tower has been built upon it. This tower, and the wooden staircases, and some twopenny-halfpenny museums, which cluster all about the edge of the falls, spoil the general effect sadly.

. . . . .

About half-way between the falls is a staircase. . . . A very steep ladder leads down the slope of the upper bank, and then an enclosed circular stair, of ninety steps, carries you down

the vertical face of the cliff. This brings you to the second slope of *debris*, and from this point you can get to either fall. . . . 1854 Ferguson

We clambered along towards the Great-fall with some difficulty, owing to a mass of the bank above having slipped, and obstructed the way with mud and stones. We went as far as the spray would permit us to go, and got down to the edge of the water. It was terrific to look up. The overhanging cliffs of Goat-island were above our heads. In front, between us and the sky, the azure water, twenty feet and more in depth, gliding over the fall, and then beat up into white spray, and surging past our feet like an agitated sea of milk. The grandeur of the scene is enhanced, I think, from this point of view, by the huge masses of rocks, hurled down by the waters, and lying in confused heaps below. They are not seen from either side, because the clouds of spray hide them; their huge black outlines dimly visible through the surf, which they themselves create from the water dashing on them, add to the feeling of terrific power with which we are impressed in gazing on this scene. Here, too, we were alone — for few ventured where we went — and this added to the pleasure of the sight. Elsewhere there were crowds. . . . But down here I saw but one hardy individual besides ourselves; and it was Nature in all her undisturbed magnificence.

. . . . .

Above all for beauty, were the falls by moonlight. At ten, it was reflected so as to light up all the water like silver; and as the wavelets rushed and boiled up, the edges were tipped with the flitting sheen, like stars. Now, at twelve, the starry appearances are gone, and the column of spray and the entire edge of the fall are lit up.

. . . . .

The view of the falls this evening, from Table-rock, impressed me most. It is from this point that there is the best view of the immense sweep of the Horseshoe-fall. Once more we have experienced that Niagara is to be felt and remembered, not

1854 Ferguson described. Our visit winds up to-night with a thunder-storm, in the midst of which the falls put on a new phase of beauty and grandeur.

1854 Golovine GOLOVINE, IVAN. Stars and stripes; or, American impressions. Lond. and N. Y.: 1856. Pp. 15–20.

The Russian was evidently more interested in conditions he found at Niagara than in the Falls themselves.

1857–1858

1857–58 Mackay MACKAY, CHARLES. Life and liberty in America; or, Sketches of a tour in the United States and Canada in 1857–8. Lond.: Smith, Elder. 1859. 1:75–99.

The author lingered for many days "in the purlieus of Niagara." He describes his sensations at the various points of view and sums up the whole thus: "But to me, if I can epitomize my feelings in four words, Niagara spoke joy, peace, order, and eternity!" The account is based on "Trans-Atlantic Sketches" published in the "*Illustrated London News.*"

1859

1859 Southesk SOUTHESK, JAMES CARNEGIE, *Earl of*. Saskatchewan and the Rocky mountains; a diary and narrative of travel, sport and adventure, during a journey through the Hudson's Bay company's territories in 1859 and 1860. Edinb.: Edmonton & Douglas. 1875. Pp. 3–4.

The author was not at all impressed by the cataract, which he had imagined "something very near the reality, except that the width was greater, and the height less" than he had expected. He considers it "too huge, and the disgustingly obtrusive civilization that crawls over its sides turns" his very heart sick. . . . "A narrower, higher cataract would strike more sharply on the mental vision than low-statured, wide-spreading Niagara."

1859 Wilson WILSON, THOMAS. Transatlantic sketches; or, Traveling reminiscences of the West Indies and United States. Montreal: John Lovell. 1860. Pp. 174–179.

1859 Deedes DEEDES, HENRY. Sketches of the south and west; or, Ten months' residence in the United States. Edinb. and Lond.: 1866. Pp. 8–11.

A description of the "current baths" and the burning spring.

WOODS, NICHOLAS A. The Prince of Wales in Canada and the United States. Lond.: Bradbury and Evans. 1861. Pp. 235–252. 1859 Woods

A very excellent account in fresh, journalistic style and graphic manner, by the *Times* special correspondent.

Here for a few short days — too few by far — there was a temporary lull in the whirlwind of addresses, reviews, processions, state balls, and noisy Orangemen. The Prince lived privately at the pretty cottage of the late Mr. Zimmerman, and several of the suite were accommodated in the rows of little cottages which fill the beautiful gardens of the Clifton House Hotel. The Prince for once in Canada was in private. State and pomp were scattered to the winds, and he rode out and walked out without a mob at his heels, and could sit and watch unobserved for hours the tremendous majesty of the scenes around him. It was on the whole quite as well that royalty was *incog.* before Niagara. The shout of a mob, or the tinsel of a procession, would have showed poorly by the side of that great Altar of Nature, where a misty incense is always rising to heaven, and the eternity of water speaks only of One. Amid that scene princes, powers, and denominations are all forgotten, as you stand before the Falls of Niagara, which pour down with such majesty of power that you can only gaze with solemn awe upon the grandest and most terrible of all God's works in nature. . . . Words . . . are powerless before the stupendous force and terror of this cataract, and all the wealth of language would be exhausted before one could tell how the great hill of waters which drops from the monstrous cliffs so smooth, so green, so deep, changes ere one can mark its fall into millions of columns of spray which, darting out like white fireworks, shoot down and down till lost in the clouds of mist which always wrap the base of the Falls in dim and grand obscurity.

. . . Every one expects so much from these cataracts, and is so eager to see them, that, fired with the notion of a second deluge, they strain their eyes in all directions as they advance and catch stray glimpses of the Falls here and there, now hidden

1859 Woods

by trees, now lost in spray, till, when they do really stand before them, they are apt at last to experience a feeling which, if not disappointment, is at least one of less surprise. Let the visitor fortify himself against indulging in these hurried glances. If anything can possibly lessen one's appreciation, or rather awe, of these tremendous cataracts, it is this. If he comes to the Canadian side, as most visitors do, he must pass over the beautiful suspension-bridge, which, like a web of iron, thin and delicate as a net, spans a tremendous ravine between the cliffs, which on either side hem the rapids in some two miles below the Falls. Let him from this look *down* the stream. There is quite enough to occupy attention as the mass of deep blue water rushes madly through the gorge far below him, checked here and there for a moment by a sunken rock, over which they storm and rave and seem to turn upon their hidden enemies in a circle of dreadful whirlpools, the ring of angry froth in which shows the vortex where beams, and trees, and logs of timber are dragged beneath and hurried down for miles and miles till they emerge at last in the quiet, solemn-looking waters of Lake Ontario. Who that has ever gazed down here from this bridge can wonder at the belief of the Indians that an evil spirit resided beneath these dreadful waters? for ever and anon out of its least angry spots a huge green wave will suddenly upheave and seem to choke and struggle with the rest. For an instant it spreads dark and terrible from cliff to cliff, as though it strove for room; then, with a fierce roar, tumbling headlong forward in a cloud of spray is carried off with a rush like the sweep of destiny. To watch these rapids as, stayed for a moment by rocks too solid even for their dash, they go pouring down wave on wave for ever will occupy the traveller sufficiently till his carriage crosses the bridge. Then let him by a winding road drive far above the Falls on the American side, and beyond where the swiftest and most awful of all rapids, those which are pouring towards the cataract, begin to show their force. Before him he will see a noble river, more than three times the width of the Thames at

A View of the Western Branch of the Falls of Niagara, Taken from the Table Rock, Looking up the River, over the Rapids

Painted by J. Vanderlyn; engraved by F. C. Lewis. Originally published in 1804

London, without a ripple on its deep surface, and flowing quickly on, though still so smooth, so treacherously quiet in its might, that one might almost think of swimming in it but that the branches of trees and little bits of timber which hurry down so fast give such a warning of the power beneath the water as even a fish would not care to disregard. A mile or so lower down, and the river begins to throw off all disguise, and hurries swiftly on, keeping the roots and plants that fringe its edge flickering and waving tremulously out, or pouring against the points of rocks and islands with a force that makes it recoil back in a feather of spray, as from the bows of a steamboat, till you can almost fancy that the very islands have got adrift and are struggling fiercely up against the stream. By-and-by foam appears on the water, then whirlpools, which spin till your head reels to look at them, then more foam, then lines of deep sunken gullies, where the blue water drops heavily down and seems to choke and rave till it becomes a livid, frothy white, freeing its waves at last in sullen heaves and throes, and rushing on again, torn, jagged, and roaring, wilder and more dangerous than ever. As you gaze upon the rush you feel a horrid yearning in your heart to plunge in and join the mad whirl and see the mystery out. Yet even with this thought at its strongest you shrink instinctively from the dreadful brink, where the very waters themselves seem hurrying to destruction. Faster and faster, and wilder and wilder, it pours with every minute throbbing over the rocks and stones in mounds of spray, like loosely driven snow, bent into crooked channels between the islands, but always rushing on as if the river was mad. Trees, tumbled over and over, toss their wet branches out of the water as if they strove for help against their enemy, and cling for one brief instant to the banks to be whirled down the next more rapidly than ever. Gradually Goat Island comes in sight, its massive piles of rocks and dense quiet foliage contrasting so strongly against the wild terrible uproar and rush of waters, writhing and dashing madly past its base. You are nearing the cataracts, and soon a dreadful

1859 Woods

1859
Woods

line of foaming breakers begin to show white in their restless anger, and looking from their massive deep slow plunges like a sea of half-thawed snow as they rave and hiss and cast their flakes high into the air. Every minute the race increases till the bubble and rush from the seething waters fill your ear and prepare the mind for that great scene below, where their majesty of terrors culminates. Yet there seem no rocks among these breakers, and you notice with surprise that all their heaving struggles are back against the stream, as if the very waves themselves were conscious of the tremendous abyss into which they were being hurried, and strove against their fate. But all in vain do the surges rise; each second adds perceptibly to their might and dash, till round Goat Island, where the great rapids commence, and where the waves

— "headlong plunge and writhe in agony"

— a perfect hell of waters — the Charybdis of the western world. None can stand on the frail bridge which spans the Rapids here without a feeling of almost alarm as he looks beneath and sees those surges, terribly beautiful, within fifty yards of their great leap, smashing over everything with a force that makes the very banks quiver with the vibration, plunging and whirling down from rock to rock with a headlong delirious fury that is at once dreadful and sublime. One minute and they overwhelm the rocks in a crowd of waves, then receding with a great convulsive leap and roar, leave the stones, bare, smooth, and polished for a single instant, till drowned and hidden by another surge that, thundering and rushing on, bounds from stone to stone,

"Crashing on cliffs which, downward worn and rent
With its fierce footsteps, yield in chasms a dreadful vent."

It is here that the resistless might of the great Falls can be best appreciated as you note the tumbling waters gathering strength for that great avalanche of waves where, racing and struggling over the cliff, they fall at last, and a mighty river is

dashed into beads of foam. Let the visitor not turn aside from the route I have attempted to describe to look at the American Falls. Elsewhere, perhaps, they would be grand and beautiful. Here, close to the great Horseshoe Cataract, on the Canadian side of Goat Island, they seem almost nothing — a mere picturesque accident of the situation. The traveller should pass at once across Goat Island, and at its furthest extremity is a frail wooden bridge, which, stretching from rock to rock on the very verge of the great Fall, leads to Terrapin Tower. And here my humble duty as guide ends, for,— 1859 Woods

> "Lo! where it comes, like an eternity,
> As if to sweep down all things in its track,
> Charming the eye with dread"

— Niagara. The idol of all worshippers of nature — the goal and object of western travel — the cataract of all the cataracts of the world is before you, and you pause with devotional sadness as "deep calleth unto deep" with thundering roar, and the great amphitheatre of green waters pouring down in silent majesty is lost forever in the clouds of spray which rise so dense beneath them. Here words are powerless, guides are useless, and he who wishes to see and feel Niagara must watch it for himself. He must study it, he must live near it, he must hear its solemn roar, and fill his mind with its every hue and aspect. He must rise at dawn and see the sun break through the pine woods, till its rays fall on the cataract, and wake its colours into life and play, lighting it up in the distance like a gigantic glacier. He must watch it hour by hour as the deep green mass always keeps nearing the edge, and no longer struggling now in waves yields to its fate, and flowing smooth as oil nearer and nearer, comes slowly and solemnly over the cliff like a green curtain, and with one stately massive plunge pours down and down, till the eye loses its rush, and the bright emerald hill of water shades into dazzling white, as broken at last in its long fall it parts into spray and disappears in the mist. He must watch its feathery edges

1859 Woods

darting over like cascades of snow upon the rocks beneath, rushing into the great basin at the foot of the cataracts, where the waters hiss and seethe in foam, yet lie all motionless now, as if stunned and crushed by their deep overthrow. Niagara has flowed from all time as it thunders now, yet even those who have lived there longest see in its mighty rush fresh beauties every hour, though its eternity of waters never alter in their bulk for summer snow or melting of the great Canadian snows. Sometimes a sudden gust of wind will rise and, clearing up the mist in broken masses like a torn cloud, show the base of the Falls, a Phlegethon of waters, where they seem to writhe, and creep, and boil in endless torture. To see this is grand; but to watch them in the evening and the night from the Canadian side is the finest and most solemn scene of all. As the sun goes behind the hills, the mist rises higher and higher, in a gauze-like cloud, which spreads from shore to shore, wrapping Goat Island in its grey sombre tinge, and making its very rocks and pine woods look watery and unsubstantial as a vision. When the silence of the night settles down at last upon the scene, the roar of the cataract seems louder and more grand, and through the darkness its great outline of foam and livid water can be dimly seen, vague, terrible, and ill-defined as is the ocean in a storm, yet making its impression of eternal force and grandeur not less distinct upon the memory, never to be forgotten. As often happens to those who watch these cataracts on a summer's night you may see the lightning playing down among the angry waters, and then the scene is one of unutterable terror and lurid grandeur.

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The first view which the Prince got of the cataracts was on the evening of his arrival, when he saw them as no man had ever seen them before, and as they will probably never be seen again — he saw the Falls of Niagara illuminated! At the first idea it seems about as feasible to light up the Atlantic as those great outpourings of Lake Erie, and Mr. Blackwell, when he started the idea, was looked on as well meaning and all that, but chimerical,

to use the mildest term. Mr. Blackwell, however, persevered, and had some 200 Bengal lights made of the very largest size which it was possible to manufacture. About 50 or 60 of these were placed in a row under the cliffs, beneath Clifton House, and facing the American Fall; 50 or 60 more were placed under Table Rock, and 50 or 60 behind the sheet of water itself, the entrance to which, from the Canadian side I have already described to the reader. At ten o'clock at night they were all lit, and their effect was something grand, magical, brilliant, and wonderful beyond all power of words to pourtray. In an instant the whole mass of water, glowing vivid, and as if incandescent in the intense light, seemed turned to molten silver. From behind the Fall the light shown with such dazzling brilliancy that the waters immediately before it looked like a sheet of crystal glass, a cascade of diamonds, every bead and stream in which leapt and sparkled and spread the glare over the whole scene, like a river of lighted phosphorus. The boiling rapids underneath dimly reflected back the pale livid gleam as from a mirror, lighting up the trees and rocks and all the wild torn chasm through which the rapids pour, and showing out the old grey ruins of Table Rock like the remains of a huge dilapidated tower. The smoke, too, rose in thick dense masses, spreading upwards over the cataracts in a luminous cloud that seemed as if Niagara was in a blaze from base to summit. But all this grandeur and beauty were as nothing to the effect produced when the lights were changed from white to red. Niagara seemed turned to blood in colour, but so bright, so lurid in its deep effulgence that a river of seething, roaring, hellish fire appeared to have taken the place in an instant of the cold, stern, eternal Falls. None could look upon this scene, the huge, fiery, blood-red mass, dark-looking and clotted in the centre, without a feeling of awe. You could not speak, so sublime were its terrors, nor move your gaze from the blazing caldron underneath the Falls, where the river seemed in its frothy red foam like boiling blood.

1859 Woods

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1859
Woods

On the following day His Royal Highness saw M. Blondin execute his most terrific feat — that of crossing the Rapids on a tight rope with a man on his back. To leave the study of these eternal cataracts to witness the feats of any rope-dancer, however skilful, is very much like shutting your prayer-book to go and witness a pantomine. Nevertheless, among the Americans Blondin is a great favourite, and many of them actually carry their admiration of his feats so far as to say that unless you see "Blondin walk" you don't see Niagara. Without being too analytical in searching after motives, I verily believe that at least one-half of the crowds that go to see Blondin go in the firm expectation that as he must fall off and be lost some day or other, they may have the good fortune to be there when he does so miss his footing, and witness the whole catastrophe from the best point of view. One thing, however, is certain, that if you do go to see Blondin, when he once begins his feats you can never take your eyes off him (unless you shut them from a very sickness of terror), till he is safe back again on land. The place where his rope was stretched was about a quarter of a mile below the Suspension Bridge, over the lower Rapids, and about two below the Falls. To do Blondin justice, his skill is so great that he would as soon stretch his rope along the edge of the Falls themselves as not, but at this place there is no point on either side to which he could secure it. All the waters of Niagara, however, could not make his fate more certain and inevitable than it would be if he fell from the place where his rope was then fixed.

It was stretched between two of the steepest cliffs over the Rapids, about 230 feet from where the waters boil and roar and plunge on in massive waves at the rate of some twenty miles an hour. To see him venture out on this thin cord and turn summersaults in the centre, standing on his head, or sitting down holding by his hands, revolving backwards over the rope like a Catherine wheel, is bad enough for nervous people; but on this Saturday, after keeping every one's hair on end thus for twenty minutes, he prepared to carry a man across on his back. The mere

physical exertion of carrying any one nearly a distance of half a mile is no slight feat, but when the space has to be traversed on a half-tight rope higher than the Monument, from the sea of boiling rapids underneath, where one false movement, the tremour of a single nerve, a moment's gust of wind, or temporary faintness, would hurry both to an instant and dreadful death, the attempt is so full of sickening terror that not many can bring themselves to witness it, and those who do, remain cold, trembling, and silent till the dreadful venture is safely passed. Blondin took the whole matter coolly enough. His Royal Highness was urgent with him not to attempt it, but he replied that there was far less real danger in the feat than appeared to lookers-on, that he was quite used to it and felt quite at ease, and that as he had everywhere announced his intention of performing it before relinquishing his attempts for the season, he felt bound to go on. He accordingly divested himself of his Indian chief's head-dress and bead-work coat, and put two strong straps crosswise over his broad muscular shoulders, each strap fitted with a flat wide iron hook, to rest on his hips, for in those his adventurous companion was to place his legs. Mr. Calcourt was the man to be carried, and this person, in addition to his own coolness and confidence in Blondin, had himself a sufficient knowledge of rope-walking to enable him to stand on it alone whenever Blondin himself wanted rest. The preparations were soon made. Blondin took a very long and rather heavy balance pole. Calcourt divested himself of his boots, and put on a pair of ordinary slippers, the soles of which were well chalked. Blondin then stood steadily, and Calcourt, grasping him round the neck, gently and slowly hoisted first one leg into the hook and then the other, and allowing his limbs to swing as relaxed as possible, the venture commenced. Of course, with a rope nearly half-a-mile long no power could draw it straight across such a gulf. It therefore sloped rapidly down at both sides from the edges of the cliffs on which it was secured. This made the attempt look doubly fearful, for it seemed impossible, as

1859
Woods

1859
Woods

Blondin went down the steep incline of cord with slow, cautious, trembling feet, with body carefully thrown back to keep his balance as he almost felt his way, that he could avoid slipping, and being dashed to fragments on the rocks far down beneath. At last, however, he passed it, though very slowly, and in about five minutes more gained the centre of the rope and stopped, when Calcourt, gently raising his legs from the hooks, slid down and stood upon the cord while Blondin rested. Getting upon his back again was a terrible business. Twice Calcourt missed raising his legs to the hooks, and Blondin oscillated violently under the efforts made on his back. This unintentional awkwardness, which no doubt arose from nervousness, I was afterwards informed, led to a fierce altercation between the voyageurs, and Blondin swore, if Calcourt was not more careful, he would leave him on the rope to get back as he best could. Awed by this threat, Calcourt was more careful, or more fortunate in his third attempt, and the dreadful walk was resumed. Three more such stoppages for rest were made. During one, when almost in the centre of the rope, there was a violent gust of wind, which fluttered Calcourt's coat tails about as if it would blow them away, and made both men sway on the little cord till the spectators were almost sick with fear and anxiety. The whole passage occupied about a quarter of an hour.

Blondin then performed the still more dangerous task of returning along the rope *on stilts* about three feet high, and this he did quickly and with apparent ease.

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. . . It is, perhaps, the best proof which can be given of the attractiveness of these stupendous cataracts that very few people trouble themselves with the neighboring scenery at all, though, if the Falls were not there, the exquisite combination of rock and woodland all around would suffice to draw visitors, from all parts of North America.

WHITE, JOHN. Sketches from America. Lond.: Sampson Low, Son, and Marston. 1870. Pp. 187–199. 1859 White

. . . Of descriptions and views of the Falls most people are fairly weary, and are ready to recoil at the very sight of the familiar names "Terrapin Tower," and "Goat Island," "Horseshoe Falls," and "Table Rock." This sketch will try to avoid enlarging upon well-known points of topography, and to dwell rather on the personal impressions of a visitor; which can, perhaps, hardly help having some individuality of their own.

. . . A feeling common among new-comers to the place — you may hear of it, and may read of it, and are sure to feel something of it yourself — is, that the thing cannot possibly last; the pace is too furious for that; at this rate, all the floods of Erie, and of those yet vaster lakes in the West, must assuredly have run off before morning; you must get up very early if you would be in time for another sight. It certainly needs some reflection to convince you, that there has not been some extra water turned on for your special behoof, and as a mere temporary arrangement. That, throughout some four hundred centuries, this same thunder has been filling the woods, this same trembling has shaken the earth, the same volumes of water have kept plunging downward, day and night, and winter and summer, is no mere Tupperian reflection at this place but the most staggering reflection of all. The mere age of other grand objects — of mountains, and oceans, and deserts — has nothing in it so oppressive; for they have lain at rest, or, at least, have known what rest is; but that this wild cataract, the world's most terrible activity, should have gone struggling on in its sleepless agony for such a very eternity of ages, is the most overpowering idea that Niagara can call up before you. But, by the morning, you have got pretty well used to the roar and to the trembling of the ground. Then, too, with the daylight comes minute inspection — comes the destruction of the ideal with the knowledge of the real — comes the death of poetry and the birth of criticism —

1859 White comes, in short, to be more matter-of-fact, the conviction that the thing is hardly quite up to the mark. What nonsense people had written about its height! It hardly looked its own 164 feet. The American Fall was formal — too square, and a little priggish. There was a want of grace in its forms, of wildness and abandonment in its movements. Then, the surroundings — those saw-mills — those photograph-shops — those great staring hotels! Nature had spoiled a good thing; and man had helped her. Other Falls, to be seen in Europe, were a hundred times more picturesque, more beautiful. Was that American so very far out, who described this Fall as a sad waste of water-power? It certainly had something of the look of a very much exaggerated mill-stream. A minute later, and you are ashamed of such judgments: for there can be no sight in the world which exercises its power over the feelings more intermittently, or with more variation in form and intensity, than this Niagara. The influence of the place seems to roll over you in waves, now bearing down in full flood, controlling you utterly and holding you breathless, now receding and leaving you free to breathe, or even to let loose the flippancies of criticism upon it — then again breaking in suddenly, and arousing you (to have done with metaphor), to a thousand beauties which before, neither in the one state nor the other, had you been able to perceive.

1859 Cornwallis CORNWALLIS, KINAHAN. Royalty in the New World; or, The Prince of Wales in America. New York: Doolady. 1860. Pp. 145–153.

An account, by a *New York Herald* correspondent, of the prince's visit, Blondin's exploits, the illumination of the Falls, etc.

1859 A British Canadian. The tour of H. R. H. the Prince of Wales through British America and the United States. Montreal: John Lovell. 1860. Pp. 187–188.

A calendar of the prince's activities at Niagara.

1860

1860 Howells HOWELLS, WILLIAM DEAN. Niagara, first and last. (The Niagara book. N. Y., 1901. Pp. 236–269.)

. . . One always experiences a vivid emotion from the sight of the Rapids, no matter how often one sees them, but I am safe in saying that one sees them for the first time but once. After that one has the feeling of a *habitué* towards them, a sort of friendly and familiar appreciation of their terrific beauty, but certainly not the thrill of the pristine awe. It is even hard to recall that: the picture remains, but not the sense of their mighty march, or of their gigantic leaps and lunges, when they break ranks, and their procession becomes a mere onward tumult without form or order. I had schooled myself for great impressions, and I did not mean to lose one of them; they were all going into that correspondence which I was so proud to be writing, and finally, I hoped, they were going into literature: poems, sketches, studies, and I do not know what all. But I had not counted upon the Rapids taking me by the throat, as it were, and making my heart stop. I still think that above and below the Falls, the Rapids are the most striking features of the spectacle. At least you may say something about them, compare them to something; when you come to the Cataract itself, you can say nothing; it is incomparable. My sense of it first, and my sense of it last, was not a sense of the stupendous, but a sense of beauty, of serenity, of repose. I have always had to take myself in hand, to shake myself up, to look twice, and to recur to what I have heard and read of other people's impressions, before I am overpowered by it. Otherwise I am simply charmed.

1860
Howells

I hurried out to look at it, and I spent the afternoon in taking a careful account of my impressions, and trying to fit phrases to my emotions for that blessed correspondence. Then I went back to my room and began to put them down on paper while they were still warm.

That pleasant room in the hotel is very vivid in my memory yet. It had a green lattice-door opening into the corridor, and when I left the inner door ajar, a delicious current of summer breeze and afternoon sunshine drew through it from the window looking out on a sweep of those Rapids. It was what they call

1860
Howells

a single room, but it seemed very spacious at that time, and it had a little table in it, where I wrote my letters to the Cincinnati paper. I lived two weeks in that room, and I made a vast deal of copy, including some poems, I believe, which never got printed, any more than most of my letters, though I did not confine the test of their merit to one editor alone.

Apart from these literary enterprises of mine there was not a great deal to occupy me in the hotel. I suppose there are moments when the hotels at Niagara are full, but I never happened there at those moments, and my hotel at the time of the first visit was far from crowded, though it was in the days before the war when Southerners were reputed to visit the Falls in great numbers. We dined at midday to the music of a brass band, which must have been more than usually brazen, to have affected my nerves the way it did, for at twenty-three the nerves are not sensitive. Very likely there were a variety of brides and grooms there, but I did not know them from the rest: so little is one condition of life able to distinguish another. There was a period when these young couples were visible to me, afterwards; and then, when I was very much older, they vanished again, and were no more to be found by the eye of earlier age than by the eye of earlier youth. I believe I saw numbers of pretty young girls, who then appeared to me stately and mature women, of great splendor and beauty, and of varying measures of haughty inapproachability. I made the acquaintance of no one in the hotel, but by a sort of affinition, which I should now be at a loss to account for, I fell in with two artists who were painting the Falls and the Rapids, and the scenery generally, and I used to go about with them, and watch them at their work. They were brothers, and very friendly fellows, not much older than I, and because I liked them, and was reaching out in every direction for the materials of greater and greater consciousness, I tried to see Niagara as actively and pervasively iridescent as they did. They invited me to criticise their pictures in the presence of the facts, and I did once intimate that I failed to find all those rainbows,

of different sizes and shapes which they had represented on the surface of the water everywhere. Then they pointed the rainbows out with their forefingers and asked, Didn't I see them there, and there, and there? I looked very hard, and as I was not going to be outdone in the perception of beauty, I said that I did see them, and I tried to believe that I saw them, but Heaven knows, I never did. I hope this fraud will not finally be accounted against me. Those were charming fellows, and other pictures of theirs I have found so faithful that I am still a little shaken about the rainbows. My artists were from Ohio, and though I was too ignorant then to affirm that Ohio art was the best art in the world, just as Ohio money was the best, still I was very proud of it, and I suppose I renowned those invisible iridescences in my letter to the Cincinnati paper. 1860 Howells

We walked all about the Falls, and over Goat Island, and to and from the Whirlpool, and it was a great advantage to me to be in the artists' company, for they knew all the loveliest places, and could show me the best points of view. I drove nowhere, because I had a fear, bred of much newspaper rumor and humor, that my accumulated treasures would not hold out against the rapacity of a single Niagara hackman. A dollar was a dollar in those days, especially if it were a dollar of Ohio money, or at least it was so till you got to Boston; and I was not willing to waste any of mine in carriage fares. But to be honest about those poor fellows, I always found the Niagara hackmen, when I visited their domain in after years, not only civil but reasonable, and I have never regretted the money I spent upon them; it was no longer Ohio money, to be sure.

Some places I could not walk to on that first visit, and as there was no suspension bridge then near the Falls, I took a boat when I wished to cross to the Canada side, and a man rowed me over the eddies of the river where they reeled away from the plunge of the Cataract. I do not think I crossed more than once, or had any wish to do so, after I had visited the battlefield of Lundy's Lane, where a veteran of the fight, so well

1860
Howells

preserved in alcohol that I should not be surprised if he were there yet, gave me an account of it from the top of a tower in which he seemed to be fortified. That poor little carnage has shrunken into so small a horror since the battles of the great war, then impending, that I feel somewhat like excusing the mention of it now; but when I visited the scene in 1860, I was aware of several emotions which, if not of prime importance on the spot, were very capable of being worked up into something worth while in my letter to the Cincinnati paper. I tried to give them a Heinesque cast, and I made a good deal of the tipsy veteran. . . .

Really, however, I did see a great many things at Niagara on that first visit, and I am sorry to say that I saw them chiefly on the Canada side. My patriotism has always felt the hurt of the fact that our great national cataract is best viewed from a foreign shore. There can be no denying, at least in a confidence like the present, that the Canadian Fall, if not more majestic, is certainly more massive, than the American. I used to watch its mighty wall of waters with a jealousy almost as green as themselves, and then try to believe that the knotted tumble of our Fall was finer. I could only make out that it had more apparent movement. But at times, and if one looked steadily at any part of the Cataract, the descending floods seemed to hang in arrest above the gulfs below. Those liquid steeps, those precipices of molten emerald, all broken and fissured with opal and crystal, seemed like heights of sure and firmset earth, and the mists that climbed them half-way were as still to the eye in their subtler sort. This effect of immobility is what gives its supreme beauty to Niagara, its repose. If there is agony there, it is in the agony of Niobe, of Laocoön. It moves the beholder, but itself it does not move.

I spent a great deal of time trying to say this or something like it, which now and always seemed to me true of Niagara, though I do not insist that it shall seem so to others. I could not see those iridescences that everywhere illumined the waters to my

artist friends, and very likely the reader, if he is a person of feeble fancy, small sympathy, and indifferent morals, will find nothing of this Repose that I speak of in Niagara. I imagine him taking my page out into the presence of the fact, and demanding, Now where is the Repose? 1860 Howells

Well, all that I can say is that it has always been there on the occasion of my visits. On the occasion of my first visit there was even a shelf of the Table Rock still there, and I went out and stood upon it, for the sake of saying that I had done so in my letter to the Cincinnati paper, though I might very well have said it without having done so, and I am almost sorry that I did not, when I remember how few of those letters that paper printed. There was no great pleasure in the experience. You were supposed to get a particularly fine view of the Horse Shoe Falls, but I got no view at all, on account of a whim of the mist. Weeks earlier a large piece of the rock had fallen just a few moments after a carriage full of people had driven off it, and I did not know but another piece might fall just a few moments before I walked off it. I was not in a carriage, and my portion of Table Rock did not fall till some three months later; that was quite soon enough for me; I should have preferred three years.

I do not know whether it was my satisfaction in this hair-breadth escape or not, but I had sufficient spirits immediately after to join a group of people near by who were taking peeps over a precipice at something below. I did not know what it was, but I thought it might be something I could work up in my letters to that Cincinnati paper, and I waited my turn among those who were lying successively on their stomachs and craning their necks over the edge; and then I saw that it was a man who was lying face upwards on the rocks below, and had perhaps been lying there some time. He was a very green and yellow melancholy of a man, as to his face, and in his workman's blue overalls he had a trick of swimming upwards to the eye of the aesthetic spectator, so that one had to push back with a hard clutch on the turf to keep from plunging over to meet him. I

1860 Howells

made a note of this morbid impulse for primary use in my letters to that Cincinnati paper, and secondary use in a poem, or sketch, or tale; and then I crawled back and went away, and was faint in secret for a while. It was strange how fully sufficing one little glimpse of that poor man was. No one knew who he was or how he had fallen over there, but after the first glance at him (I believe I did not give a second) I felt that we did not part strangers. Now I meet people at dinner and pass whole evenings with them, and cannot remember their faces so as to place them the next week. But I think I could have placed that poor man years afterwards. To be sure the circumstances are different, and I am no longer twenty-three.

Do they still, I wonder, take people to see a place not far above the Canadian Fall, where a vein of natural gas vents itself amid the trouble of the waters, and the custodian sets fire to it with a piece of lighted newspaper? They used to do that, if you paid them a quarter, in a little pavilion built over the place to shut out the unpaying public. By comparison with the great gas wells which I saw in combustion long after at Findlay, this was a very feeble rush light conflagration indeed, but it had the merit of being much more mysterious. I, for instance, did not know it was natural gas, or what it was, and the custodian sagely would not say; the mystery was probably part of his stock in trade. There were many mysteries, maintained at a profit, about Niagara then, and not the least of them was Terrapin Tower, which stood at the brink of the American Fall, and was reached by a series of stepping stones and bridges amidst the rapids. The mystery of this was that any human being should wish to go up it, but everybody did. I myself found a bridal couple (of the third espousals) in it when I ventured a vast deal of potential literature in its frail keeping; no terrapin, I fancy, was ever so rash as to ascend it, from the day it was built to the day it was taken away. What is so amusing now to think of, though not so amusing then, is that all the while I was clambering about

those heights and brinks, I was suffering from an inveterate ver- 1860
tigo, which made plain ground rather difficult for me at times. Howells
At odd moments it became necessary for me to lay hold of something and stay the reeling world; and the recurrence of these exigencies finally decided me against venturing into the Cave of the Winds. Upon the whole I am glad I did not penetrate it, for now I can think it what I like, and if I had seen it I probably could not do that. I compromised by descending the Biddle Stairs, which had a rail to hold on by, and which, I have no doubt, amount to much the same thing as the Cave of the Winds. At any rate, when I got to the bottom of them, I wondered why in the world I had come down.

I do not know whether under the present socialistic régime, or state control, of the Falls, there are so many marvels shown as under the old system of private enterprise. But I am sure that their number could have been greatly reduced, with advantage to the visitor. If you find a marvel advertised, and you learn that you cannot see it without paying a quarter, every coin upon your person begins to burn in an intense sympathy with your curiosity, and you cannot be content till you have seen that marvel. This was the principle of human nature upon which private capital had counted, and it did not matter that the Falls themselves were enough to glut the utmost greed of wonder. Their prodigious character was eked out by every factitious device to which the penalty of twenty-five cents could be attached. I remember that at the entrance of Prospect Park, if not within the sacred grove, a hardy adventurer had pitched his tent and announced the presence of a five-legged calf within its canvas walls, in active competition with the great Cataract. I paid my quarter (my Ohio money was all paper, or I might have thought twice about it) in order to make sure that this calf was in no wise comparable to Niagara. I do not say that the picture of the calf on the outside of the tent was not as good as some pictures of Niagara that I have seen. It was at least as much like.

1860
Howells

I hope that all this is not decrying the attractions of any worthy adjunct of the Cataract, such as the Whirlpool. There is of course no other such, and I was proud and glad to believe that the Whirlpool was chiefly on the American side, or the first part of it, or was at first nearly if not solely accessible from our territory; and I did not find out till long after that I was wrong. The Whirlpool, seen from the heights around it, has that effect of sculpturesque repose which I have always found the finest thing in the Cataract itself. Like that it is impassioned, while the Rapids are passionate. From the top the circling lines of the Whirlpool seemed graven in a level of chalcedony; the illusion of arrest was so perfect that I was almost sorry ever to have lost it, though I do not know what I could have done with it if I had kept it. I duly studied my phrases about it for my letters to that Cincinnati paper, and it is probably from some of them, printed or unprinted, that I speak now. These things linger long in the mind; and it is not always from frugality that the observer of the picturesque uses the same terms again and again. Happily, I am not obliged to describe the Whirlpool to the reader, as I was then, and I have no impression to impart except this sense of its worthy unity with the Cataract in what I may call its highest aesthetic quality, its repose.

If the reader does not believe in this, he may go and look; but there is one fact of this first visit of mine to Niagara which he must helplessly take my word for. That fact is Blondin, who is closely allied in my mind with the Whirlpool, because I saw him cross the river above the frantic Rapids not far from it. If this association is too mechanical, too material, then I will go farther, and say that when Blondin had got such a distance into the danger, he, too, became an illusion of Repose; and I defy the most skeptical reader, who was not then present, to gainsay me.

Why those rapids just below the large Suspension Bridge were chosen to stretch Blondin's cable over, I do not know, unless it was because the river narrows to a gorge there, and because those rapids are more horrid, in the eighteenth-century sense,

than any other feature of Niagara. They have been a great deal exploited since Blondin's time by adventurers who have attempted to swim them, and to navigate them in barrels and buoys and India-rubber balls, or if not quite India-rubber balls, I do not know why. But at that time no craft but the Maid of the Mist, the little steamboat which used to run up to the foot of the cataract, had ever dared them. She, indeed, flying from the perennial pun involved in her name, not to mention the sheriff's officer who had an attachment for her, weathered the rapids and passed in and out of the Whirlpool, and escaped into the quiet of Canadian waters, with the pilot and her engineer on board. Afterwards I saw her at Quebec, where she had changed her name, as other American refugees in Canada have done, and had now become the Maid of Orleans, in recognition of her peaceful employ of carrying people to and from the Isle of Orleans. But her adventurous voyage was still fresh on the lips of guides and hackmen when I was first at Niagara, and I looked at the Rapids and the Whirlpool with an interest peculiarly fearful because of it. 1860 Howells

As usual, I walked to the scene of the exploit I was about to witness, but there were a good many people walking, and they debated on the way whether Blondin would cross that day or not. It had been raining over night, and some said his cable was not in condition; others, that the guys which stayed it on either side were too slack, or too taut from the wet. Nevertheless, we found a great crowd on the Canada shore, which seemed to command the best view of Blondin as well as of Niagara, and the American shore was dense with spectators, too. As the hour drew near for Blondin to do his feat, we were lost in greater and greater doubt whether he would do it or not, and perhaps if a vote had been taken the skeptics would have carried the day, when he suddenly danced out upon the cable before our unbelieving eyes.

The dizzy path was of the bigness of a ship's cable, at the shore, but it seemed to dwindle to a thread where it sank over the centre of the gulf, down toward those tusked and frothing

1860
Howells

breakers. They seemed to jump at it, like a pack of maddened wolves, and to pull one another back, and then to tumble and flow away, forever different, forever the same. The strong guys starting from the rocks of the precipice and the level of the rapids could stay it, after all, only a little part of its length, and beneath them and up through them, the black cedars thrust their speary tops, with that slant toward the middle of the gorge, which must be from the pull of the strong draft between its walls. They made a fine contrast of color with the floods breaking snowy white from their bulks of glassy green; and for the rest there was the perfect blue of the summer heaven over all.

There was no testing of the guys, whether they were slack or taut, or of the cable, whether it was in condition, and in fact no one thought of either, such was the surprise of seeing that pink figure of a man spring out into space from some source which I, at least, had not observed. He was in the conventional silk fleshings of the rope-dancer, and he carried a very long balancing pole. At first there was some reality in the apparition. One felt he was a fellow-man about to dare death for our amusement, but as he began to run down the slope of the cable toward the centre, one rapidly lost this sense, and beheld him as a mere feature of the general prospect. Perhaps he was aware of this effect and chose to startle us back to our consciousness of his humanity, or perhaps it was a wonted trick, intended to heighten the interest of the spectacle. At any rate, in the very middle of the river, he seemed suddenly to falter, and he swayed from side to side as if he were going to fall. A sort of groan went through the crowd, and several women fainted. Then Blondin made believe to recover himself, and began to climb the slope of this cable to the further shore. I do not know just how far this was, but I think it may have been well on to half a mile; as to the height above the rapids where the cable hung it looked like a hundred and fifty feet. I made some vague notes of these matters after Blondin vanished into the crowd beyond, but there was not much time for conjecture. He came into sight again almost at

once, a little puppet, running down the farther slope of the cable, and growing a little and a little larger as he drew near. Presently one noticed that he had left his balancing pole behind, and was tripping forward with outstretched arms. 1860 Howells

I stood where I could see him well, on his return, and I looked at him with something of the interest one might feel in a man who had come back from the dead and had put on his earthly personality again. I do not remember his face, which was no doubt as good or as bad a face as any mountebank's or monarch's, but his feet seemed to me the very most intelligent feet in the world, pliable, sinuous, clinging, educated in every fibre, and full of spiritual sentience. They had the air of knowing that the whole man was trusted to them, and, such as he was, that he was in their power and keeping alone. They rose and fell upon the cable with an exquisite accuracy, and a delicate confidence which had nothing foolhardy in it. Blondin's head might take risks, but it was clear that Blondin's feet took none; whatever they did they did wittingly, and with a full forecast of the chances and consequences. They were imaginably such feet as Isaac Taylor conjectures we may have in another life, where the intellect shall not be seated in the brain alone, but shall be issued to every part of the body, and present in every joint and limb.

They were an immense consolation to me, those feet, and when Blondin went tripping gayly out upon them over his rope again, I breathed much more freely than I had before; they had, as it were, personally reassured me, and given me their honor that nothing should happen to him; those feet and I had a sort of common understanding about him, and I do not think they respected him any more than I did for risking his life in that manner. He went down the rope and up the rope dwindling from a pink man to a pink puppet as before, and going to nothing in the crowd. Then he came to something once more, and began to grow from a puppet into a man again, but with something odd about him. He had resumed his balancing pole, and he had something strange on his feet, those wise feet, and, as he drew

1860
Howells

nearer, we could see that he had wooden buckets on them, of about the bigness of butter firkins; I tell it, not expecting much to be believed, for I did not believe it when I saw it. But till he arrived, I could say to myself that there were no bottoms in those buckets, and that his sagacious feet, though somewhat impeded, had still no doubt a good chance to save him, if he lost his head, and would be equal to any common emergency. That was the opinion of everyone about me, and though I knew how vexed with him the feet must be, I did not wholly lose patience till I was told by one who saw the buckets after Blondin stepped out of them, that they had wooden bottoms like any other butter firkins. Then I was glad that I did not see his feet again, for I could imagine the look of cold disgust, the look of haughty injury they must wear at having been made privy to such a mere brutal audacity.

The man himself looked cool and fresh enough, but I, who was not used to such violent fatigues as he must have undergone in these three transits, was bathed in a cold perspiration, and so weak and worn with making them in sympathy that I could scarcely walk away.

Long afterwards I was telling about this experience of mine — it was really more mine than Blondin's — in the neat shop of a Venetian pharmacist, to a select circle of the physicians who wait in such places in Venice for the call of their patients. One of these civilized men, for all comment, asked: "Where was the government?" and I answered in my barbarous pride of our individualism, "The government had nothing to do with it. In America the government has nothing to do with such things."

But now I think that this Venetian was right, and that such a show as I have tried to describe ought no more to have been permitted than the fight of a man with a wild beast. It was an offence to morality, and it thinned the frail barrier which the aspiration of centuries has slowly erected between humanity and savagery. But for the time being I made no such reflections. I got back to my hotel and hastened to send off a whole letter

about Blondin to that Cincinnati paper; and to this day I do not know whether they ever printed it or not. I try to make fun of it now, but it was not funny then. All the way round on that tour, my view of the wonders of nature and the monuments of man was obscured by my anxiety concerning the letters I wrote to that Cincinnati paper; and at all the hotels where I stopped I hurried to examine the files of the reading-room and see whether it had kept faith with me or not. Across many years, across graves not a few, I can reach and recall the hurt vanity, the just resentment, and the baffled hope that were bound up in that early experience of editorial frailty. 1860 Howells

My first visit to Niagara was paid in the midsummer of the year, and the midsummer of my life. All nature was rich and beautifully alive amid scenes which I think are of her noblest. There were places where the fresh scent of the waters was mixed with the fragrance of wild flowers; the birds which sang inaudibly in the immediate roar of the Cataract made themselves sweetly heard in the heart of Goat Island. Everywhere there were pretty young girls, in hats which they were then beginning to wear after a long régime of bonnets, and their hats had black plumes in them that drooped down as near to the cheeks of the pretty young girls as they could get.

I can scarcely help heaving a sigh for the wrinkles in those cheeks which the plumes, if they still drooped instead of sticking militantly up on the front and back of the hats, would not be so eager to caress now; but I will not insist a great deal upon a sort of sigh which has been often known in print already. I think it much more profitable to note that all the *entourage* of Niagara was then private property, and was put to those money-making uses at the expense of the public which form one of the holiest attributes of that sacred thing. I never greatly objected to the paper-mills on Goat Island; they were impertinent to the scenery, of course, but they were picturesque, with their low-lying, weather-worn masses in the shelter of the forest trees, beside the brawling waters. But nearly every other assertion of private rights in the

1860
Howells

landscape was an outrage to it. I will not even try to recall the stupid and squalid contrivances which defaced it at every point, and extorted a coin from the insulted traveller at every turn. They are all gone now, and in the keeping of the State the whole redeemed and disenthralled vicinity of Niagara is an object lesson in what public ownership, whenever it comes, does for beauty.

I had the eagerness of a true believer to see this result, and even before I went to look at the cataract on my last visit a winter ago, I drove about and made sure from the liberated landscape that the people were in possession of their own. It was wonderful, even in midwinter, the difference in dignity and prosperity that not so much appeared as seemed to reappear, and to find in the beholder's consciousness a sense of what that divine prospect must have been when the eye of the white man first gazed upon it. The landscape had got back something of its youth, and in my joy in it I got back something of mine.

I do not say that I got much. At fifty, one is at least not twice as young as at twenty-five. But I was very fairly young again when I came to Niagara in the midwinter of my midwinter year, and I was certainly as impatient as I could have been a quarter of a century earlier to see the ice-bridge below the Falls and the ice-cone that their breath had formed; in fact, I had waited a good deal longer to see them. Shall I own that at first sight these were a disappointment? At first sight the Falls themselves are a disappointment, for we come to them with something other than the image of their grand and simple adequacy in our minds, and seek to match them with that distempered invention of the ignorant fancy. I had supposed the ice-cone was a sharp peak, jutting up in front of the Cataract, not reflecting that it must be what it always is, a rounded knoll, built up finely, finely, slowly, slowly, out of the spectral shapes of mist, seized by the frost and flung down upon the frozen river. When you remember that this ice-cone is formed of the innumerable falls of these ghosts, I thing one ought to be content with the Romanesque dome-shape of the mound, however Gothic one's expecta-

tion may have been. I do not deny that I should still prefer the pinnacle, but that is because I prefer Gothic architecture; and I advise the reader not to hope for it. If he has a pleasure in delicate decoration, the closely stippled slopes of the ice-cone will give it to him; it is like that fine jeweller's work on the grain of dead gold where the whole surface is fretted with infinitesimal points. When these catch the sun of such a blue midwinter sky as lifted its speckless arch above the ice-cone on the day I saw it, the effect is all that one has a right to ask of mere nature. I am trying to hint that I would have built the ice-cone somewhat differently, if it had been left to me, but that I am not hypercritical. If it seems a little low, a little lumpish in the retrospect, still it has its great qualities, which I should be the last in refusing to recognize. 1860 Howells

The name ice-bridge had deceived me, but the ice-bridge did not finally disappoint me. It is not a bridge at all. It is the channel of the river blocked as far as the eye can see down the gorge with huge squares and oblongs of ice, or of frozen snow, as they seem, and giving a realizing effect to all the remembered pictures of arctic scenery. This was curiously heightened by some people with sleds among the crowds, making their way through the ice pack from shore to shore; there wanted only the fierce dash of some Esquimaux dog-team and the impression would have been perfect. It was best to look down upon it all from the cliffs, when at times the effect was more than arctic, when it was lunar; you could fancy yourself gazing upon the face of a dead world, or rather a plaster mask of it, with these small black figures of people crawling over it like flies. It was perfectly still that day, and in spite of the diapason of the Falls, an inner silence possessed the air. From the cliffs along the river the cedars thrust outward, armored in plates of ice, like the immemorial effigies of old-time warriors, and every cascade that had flung its bannerol of mist to the summer air, was now furled to the face of the rock and frozen fast. Again a sense of the repose, which is the secret of Niagara's charm, filled me.

1860 Howells

There was repose even in the peculiar traffic of Niagara when we penetrated to a shop devoted to the sale of its bric-a-brac for some photographs of the winter scenery, and we fancied a weird surprise and a certain statuesque reluctance in the dealer. But this may have been merely our fancy. I would insist only upon the mute immobility of the birds on the feather fans behind the glazed shelves, and a mystical remoteness in the Japanese objects mingled with the fabrics of our own Indians and the imported feldspar cups and vases.

Our train went back to Buffalo through the early winter sunset, crimson and crimsoner over the rapids, and then purple over the ice where the river began to be frozen again. This color was so intense that the particles of ice along the brink were like a wilding growth of violets — those candied violets you see at the confectioner's.

1860 Taylor

TAYLOR, BAYARD. Home and abroad; a sketch-book of life, scenery, and men. N. Y.: G. P. Putnam. 1860. P. 483.

In a paragraph in *Landscapes of the world*, Taylor says "As for cataracts, Niagara in tremendous volume, drowns all others. . . . Niagara is the Titan in whose presence you stand dumb."

1858–1861

1858–61 Trollope

TROLLOPE, ANTHONY. North America. Lond.: Chapman and Hall. 1862. 1:136–152. Phila.: Lippincott. 1863. 1:101–113.

Anthony Trollope made several visits to Niagara in 1858–61.

Of all the sights on this earth of ours which tourists travel to see — at least of all those which I have seen — I am inclined to give the palm to the Falls of Niagara. In the catalogue of such sights I intend to include all buildings, pictures, statues, and wonders of art made by men's hands, and also all beauties of nature prepared by the Creator for the delight of his creatures. This is a long word; but, as far as my taste and judgment go, it is justified. I know no other one thing so beautiful, so glorious, and so powerful. . . . At Niagara there is that fall of waters alone. But that fall is more graceful than Giotto's tower, more

noble than the Apollo. The peaks of the Alps are not so astounding in their solitude. The valleys of the Blue Mountains in Jamaica are less green. The finished glaze of life in Paris is less invariable: and the full tide of trade round the Bank of England is not so inexorably powerful. 1858–61 Trollope

. . . . .

In visiting Niagara, it always becomes a question on which side the visitor shall take up his quarters. On the Canada side there is no town; but there is a large hotel beautifully placed immediately opposite to the falls, and this is generally thought to be the best locality for tourists. In the State of New York is the town called Niagara Falls; and here there are two large hotels, which, as to their immediate site, are not so well placed as that in Canada. . . . My advice on the subject to any party starting for Niagara would depend upon their habits or on their nationality. I would send Americans to the Canadian side, because they dislike walking; but English people I would locate on the American side, seeing that they are generally accustomed to the frequent use of their own legs. The two sides are not very easily approached one from the other. Immediately below the falls there is a ferry, which may be traversed at the expense of a shilling; but the labor of getting up and down from the ferry is considerable, and the passage becomes wearisome. There is also a bridge; but it is two miles down the river, making a walk or drive of four miles necessary, and the toll for passing is four shillings, or a dollar, in a carriage, and one shilling on foot. As the greater variety of prospect can be had on the American side, as the island between the two falls is approachable from the American side and not from the Canadian, and as it is in this island that visitors will best love to linger, and learn to measure in their minds the vast triumph of waters before them, I recommend such of my readers as can trust a little — it need be but a little — to their own legs to select their hotel at Niagara Falls town.

It has been said that it matters much from what point the falls

1858–61
Trollope

are first seen, but to this I demur. It matters, I think, very little, or not at all. Let the visitor first see it all, and learn the whereabouts of every point, so as to understand his own position and that of the waters; and then, having done that in the way of business, let him proceed to enjoyment. . . .

Up above the falls for more than a mile the waters leap and burst over rapids, as though conscious of the destiny that awaits them. Here the river is very broad and comparatively shallow, but from shore to shore it frets itself into little torrents, and begins to assume the majesty of its power. . . . The waters, though so broken in their descent, are deliciously green. This colour, as seen early in the morning or just as the sun has set, is so bright as to give to the place one of its chiefest charms.

This will be best seen from the farther end of the island—Goat Island, as it is called—which, as the reader will understand, divides the river immediately above the falls. Indeed, the island is a part of that precipitously-broken ledge over which the river tumbles, and no doubt in process of time will be worn away and covered with water. The time, however, will be very long. In the mean while it is perhaps a mile round, and is covered thickly with timber. . . . The bridge by which the island is entered is a hundred yards or more above the smaller fall. The waters here have been turned by the island, and make their leap into the body of the river below at a right angle with it—about two hundred yards below the greater fall. Taken alone, this smaller cataract would, I imagine, be the heaviest fall of water known; but taken in conjunction with the other, it is terribly shorn of its majesty. The waters here are not as green as they are at the larger cataract; and, though the ledge has been hollowed and bowed by them so as to form a curve, that curve does not deepen itself into a vast abyss as it does at the horseshoe up above. This smaller fall is again divided; and the visitor, passing down a flight of steps and over a frail wooden bridge, finds himself on a smaller island in the midst of it.

But we will go at once on to the glory, and the thunder, and the majesty, and the wrath of that upper hell of waters. . . .

Advancing beyond the path leading down to the lesser fall, we come to that point of the island at which the waters of the main river begin to descend. From hence across to the Canadian side the cataract continues itself in one unabated line. But the line is very far from being direct or straight. After stretching for some little way from the shore to a point in the river which is reached by a wooden bridge at the end of which stands a tower upon the rock,— after stretching to this, the line of the ledge bends inwards against the flood — in, and in, and in — till one is led to think that the depth of that horseshoe is immeasurable. It has been cut with no stinting hand. A monstrous cantle has been worn back out of the centre of the rock, so that the fury of the water converges; and the spectator, as he gazes into the hollow with wishful eyes, fancies that he can hardly trace out the centre of the abyss. 1858–61 Trollope

Go down to the end of that wooden bridge, seat yourself on the rail, and there sit till all the outer world is lost to you. There is no grander spot about Niagara than this. The waters are absolutely around you. If you have that power of eye-control which is so necessary to the full enjoyment of scenery, you will see nothing but the water. You will certainly hear nothing else; and the sound, I beg you to remember, is not an ear-cracking, agonizing crash and clang of noises, but is melodious and soft withal, though loud as thunder. It fills your ears, and, as it were, envelops them, but at the same time you can speak to your neighbor without an effort. But at this place, and in these moments, the less of speaking, I should say, the better. There is no grander spot than this. Here, seated on the rail of the bridge, you will not see the whole depth of the fall. In looking at the grandest works of nature, and of art too, I fancy it is never well to see all. There should be something left to the imagination, and much should be half concealed in mystery. The greatest charm of a mountain range is the wild feeling that there must be strange, unknown, desolate worlds in those far-off valleys beyond. And so here, at Niagara, that converging rush

1858–61
Trollope

of waters may fall down, down at once into a hell of rivers, for what the eye can see. It is glorious to watch them in their first curve over the rocks. They come green as a bank of emeralds, but with a fitful, flying colour, as though conscious that in one moment more they would be dashed into spray and rise into air, pale as driven snow. The vapour rises high into the air, and is gathered there, visible always as a permanent white cloud over the cataract; but the bulk of the spray which fills the lower hollow of that horseshoe is like a tumult of snow. This you will not fully see from your seat on the rail. The head of it rises ever and anon out of that caldron below, but the caldron itself will be invisible. It is ever so far down — far as your imagination can sink it. But your eyes will rest full upon the curve of the waters. The shape you will be looking at is that of a horseshoe, but of a horseshoe miraculously deep from toe to heel; and this depth becomes greater as you sit there. That which at first was only great and beautiful, becomes gigantic and sublime, till the mind is at loss to find an epithet for its own use. To realize Niagara, you must sit there till you see nothing else than that which you have come to see. You will hear nothing else, and think of nothing else. At length you will be at one with the tumbling river before you. You will find yourself among the waters as though you belonged to them. The cool, liquid green will run through your veins, and the voice of the cataract will be the expression of your own heart. You will fall as the bright waters fall, rushing down into your new world with no hesitation and with no dismay; and you will rise again as the spray rises, bright, beautiful, and pure. Then you will flow away in your course to the uncompassed, distant, and eternal ocean.

When this state has been reached and has passed away, you may get off your rail and mount the tower. I do not quite approve of that tower, seeing that it has about it a gingerbread air, and reminds one of those well-arranged scenes of romance in which one is told that on the left you turn to the lady's bower, price

A Distant View of the Falls of Niagara, Including both Branches, with the Island and Adjacent Shores, Taken from the Vicinity of the Indian Ladder

Painted by J. Vanderlyn; engraved by Merigot. Originally published in 1804

sixpence; and on the right ascend to the knight's bed, price sixpence more, with a view of the hermit's tomb thrown in. But nevertheless the tower is worth mounting, and no money is charged for the use of it. It is not very high, and there is a balcony at the top on which some half dozen persons may stand at ease. Here the mystery is lost, but the whole fall is seen. It is not even at this spot brought so fully before your eye, made to show itself in so complete and entire a shape, as it will do when you come to stand near to it on the opposite or Canadian shore. But I think that it shows itself more beautifully. And the form of the cataract is such that here, on Goat Island, on the American side, no spray will reach you, although you are absolutely over the waters. But on the Canadian side, the road as it approaches the fall is wet and rotten with spray, and you, as you stand close upon the edge, will be wet also. The rainbows as they are seen through the rising cloud— for the sun's rays as seen through these waters show themselves in a bow, as they do when seen through rain — are pretty enough, and are greatly loved. For myself, I do not care for this prettiness at Niagara. It is there, but I forget it, and do not mind how soon it is forgotten.

1858–61 Trollope

But we are still on the tower; and here I must declare that though I forgive the tower, I cannot forgive the horrid obelisk which has latterly been built opposite to it, on the Canadian side, up above the fall; built apparently — for I did not go to it — with some camera-obscura intention for which the projector deserves to be put in Coventry by all good Christian men and women. At such a place as Niagara tasteless buildings, run up in wrong places with a view to money making, are perhaps necessary evils. It may be that they are not evils at all; that they give more pleasure than pain, seeing that they tend to the enjoyment of the multitude. But there are edifices of this description which cry aloud to the gods by the force of their own ugliness and malposition. As to such, it may be said that there should

1858–61
Trollope

somewhere exist a power capable of crushing them in their birth. This new obelisk, or picture-building at Niagara, is one of such.

And now we will cross the water, and with this object will return by the bridge out of Goat Island, on the main land of the American side. But as we do so, let me say that one of the great charms of Niagara consists in this: that over and above that one great object of wonder and beauty, there is so much little loveliness — loveliness especially of water I mean. There are little rivulets running here and there over little falls, with pendent bows above them, and stones shining under their shallow depths. As the visitor stands and looks through the trees, the rapids glitter before him, and then hide themselves behind islands. They glitter and sparkle in far distances under the bright foliage, till the remembrance is lost, and one knows not which way they run. And then the river below, with its whirlpool — but we shall come to that by-and-by, and to the mad voyage which was made down the rapids by that mad captain who ran the gauntlet of the waters at the risk of his own life, with fifty to one against him, in order that he might save another man's property from the sheriff.

The readiest way across to Canada is by the ferry; and on the American side this is very pleasantly done. You go into a little house, pay twenty cents, take a seat on a wooden car of wonderful shape, and on the touch of a spring find yourself travelling down an inclined plane of terrible declivity, and at a very fast rate. You catch a glance of the river below you, and recognize the fact that if the rope by which you are held should break, you would go down at a very fast rate indeed, and find your final resting-place in the river. As I have gone down some dozen times, and have come to no such grief, I will not presume that you will be less lucky. Below there is a boat generally ready. If it be not there, the place is not chosen amiss for a rest of ten minutes, for the lesser fall is close at hand, and the larger one is in full view. Looking at the rapidity of the river, you will think that the passage must be dangerous and difficult. But no accidents

ever happen, and the lad who takes you over seems to do it with sufficient ease. The walk up the hill on the other side is another thing. It is very steep, and for those who have not good locomotive power of their own, will be found to be disagreeable. In the full season, however, carriages are generally waiting there. In so short a distance I have always been ashamed to trust to other legs than my own, but I have observed that Americans are always dragged up. I have seen single young men of from eighteen to twenty-five, from whose outward appearance no story of idle, luxurious life can be read, carried about alone in carriages over distances which would be counted as nothing by any healthy English lady of fifty. None but the old invalids should require the assistance of carriages in seeing Niagara, but the trade in carriages is to all appearances the most brisk trade there. 1858–61 Trollope

Having mounted the hill on the Canada side, you will walk on toward the falls. As I have said before, you will from this side look directly into the full circle of the upper cataract, while you will have before you, at your left hand, the whole expanse of the lesser fall. For those who desire to see all at a glance, who wish to comprise the whole with their eyes, and to leave nothing to be guessed, nothing to be surmised, this no doubt is the best point of view. . . .

Here. on this side, you walk on to the very edge of the cataract, and, if your tread be steady and your legs firm, you dip your foot into the water exactly at the spot where the thin outside margin of the current reaches the rocky edge and jumps to join the mass of the fall. The bed of white foam beneath is certainly seen better here than elsewhere, and the green curve of the water is as bright here as when seen from the wooden rail across. But nevertheless I say again that that wooden rail is the one point from whence Niagara may be best seen aright.

Close to the cataract, exactly at the spot from whence in former days the Table Rock used to project from the land over the

1858–61
Trollope

boiling caldron below, there is now a shaft, down which you will descend to the level of the river, and pass between the rock and the torrent. This Table Rock broke away from the cliff and fell, as up the whole course of the river the seceding rocks have split and fallen from time to time through countless years, and will continue to do till the bed of the upper lake is reached. You will descend this shaft, taking to yourself or not taking to yourself a suit of oil-clothes as you may think best. I have gone with and without the suit, and again recommend that they be left behind. I am inclined to think that the ordinary payment should be made for their use, as otherwise it will appear to those whose trade it is to prepare them that you are injuring them in their vested rights.

. . . . . .

. . . the visitor stands on a broad, safe path, made of shingles, between the rock over which the water rushes and the rushing water. He will go in so far that the spray, rising back from the bed of the torrent, does not incommode him. With this exception, the farther he can go in the better; but circumstances will clearly show him the spot to which he should advance. Unless the water be driven in by a very strong wind, five yards make the difference between a comparatively dry coat and an absolutely wet one. And then let him stand with his back to the entrance, thus hiding the last glimmer of the expiring day. So standing, he will look up among the falling waters, or down into the deep, misty pit, from which they reascend in almost as palpable a bulk. The rock will be at his right hand, high and hard, and dark and straight, like the wall of some huge cavern, such as children enter in their dreams. For the first five minutes he will be looking but at the waters of a cataract — at the waters, indeed, of such a cataract as we know no other, and at their interior curves which elsewhere we cannot see. But by-and-by all this will change. He will no longer be on a shingly path beneath a waterfall; but that feeling of a cavern wall will grow

upon him, of a cavern deep, below roaring seas, in which the waves are there, though they do not enter in upon him; or rather, not the waves, but the very bowels of the ocean. He will feel as though the floods surrounded him, coming and going with their wild sounds, and he will hardly recognize that though among them he is not in them. And they, as they fall with a continual roar, not hurting the ear, but musical withal, will seem to move as the vast ocean waters may perhaps move in their internal currents. He will lose the sense of one continued descent, and think that they are passing round him in their appointed courses. The broken spray that rises from the depths below, rises so strongly, so palpably, so rapidly, that the motion in every direction will seem equal. And, as he looks on, strange colours will show themselves through the mist; the shades of grey will become green or blue, with ever and anon a flash of white; and then, when some gust of wind blows in with greater violence, the sea-girt cavern will become all dark and black. Oh, my friend, let there be no one there to speak to thee then; no, not even a brother. As you stand there speak only to the waters. 1858–61 Trollope

1861

KOHL, J. G. Travels in Canada, and through the states of New York and Pennsylvania. Tr. by Mrs. Percy Sinnett. Rev. by the author. Lond.: Manwaring. 1861. 2:128–178. 1861 Kohl

The author spent five days at the Falls, saw everything, and gave a splendid account of his visit with sane descriptions written in an easy, interesting style. He writes of the early accounts of the Falls, disparaging Hennepin, and discussing the claims for discovery advanced for Champlain, Breboeuf and La Salle. He devotes considerable space to his conclusions regarding the natural features, the sound, the atmospheric conditions, and the psychological effect and fascination of the Falls, and gives various interesting anecdotes, notably one of a slave found by his southern master employed as a waiter in a Niagara hotel. He picked out the most important things, and was evidently a close observer and investigator, with a proper sense of values.

1862 Biart

BIART, LUCIEN. A travers l'Amérique, nouvelles et recits. . . . Paris: Bibliothéque du Magasin des Demoiselles. 1876. Pp. 89–94.

A graphic account of Niagara in winter, so well written that bits of it are quoted in the original.

Je restai longtemps en extase, le regard fixe, muet, anéanti. Je ne pensai pas, je contemplais épouvanté cette masse d'eau croulante, des abimes vertigneux cette nature désolée. La première fois que j'avais vu l'Océan, c'était par un beau jour de printemps: les flots tranquilles venaient mourir sur la grève qu'ils semblaient caresser avec mollesse; mon attente avait été décue. Ici, au contraire, comme lorsque je pénétrai en novice dans forêt vierge, le spectacle dépassait tout ce que j'avais rêvé; mon imagination était vaincue.

Une heure auparavant, j'admirais de fines gravures suspendues aux murs d l'hôtel, et qui représentaient le Niagara sous les aspects que nous connaissons tous: bouquets d'arbes verts, chemins sablés, maisons coquettes, belles dames et élégants cavaliers se promenant à travers un paysage aussi soigné qu'un parc anglais. L'hiver avait bien transformé cette scène: devant moi se déroulait un panorama sévère, morne, désert. Les roches qui, du côté des États-Unis, apparaissent par intervalles et dont les masses noires tranchent sur l'écume avec tant de vigeur, demeuraient cachées sous une couche de glace, tandis que la pointe de l'île de la Chèvre, blanchie par la neige se confondait avec l'eau que bouilonnait alentour. Je ne voyais qu'une masse de liquide de plus de mille mètres de largeur s'avancer avec majesté puis se précipiter dans un gouffre qu'elle semble vouloir combler. On eût dit la mer rompant ses digues et débordant sur le monde.

. . . . .

Arrivé sur la berge du Canada, j'aperçois à ma gauche la chute dite des État-Unis; en face, le fer à cheval de la chute principale La berge qui longe le fleuve, élevée d'au moins dent

mètres, se dresse partout à pic; une pluie perpétuelle, produite par l'eau qui rejaillit, couvre la neige d'un manteau de verglass et partout oú l'eau filtre avec lenteur, elle forme de fines aiguilles de glace qui atteignent une longueur de plusieurs mètres. Un rayon de soleil inespéré vient illuminer la scène; un arc-en-ciel se dessine dans le tumultueux tourbillon; les roches etincellent sous leur couche de givre, l'eau qui se précipite prend des teintes bleuâtres; les aiguilles transparentes, irisées par la lumière, semblent encadrer les chutes d'une gigantesque monture de diamants. 1862 Biart

. . . . .

J'en fus quitte pour une formidable douche et je me trouvai sur un terrain noirâtre, dans une demi-obscurité, au milieu d'une atmosphère comparativement chaude. Le nègre ne me lâcha plus; nous nous avançâmes à pas comptés le long d'un chemin si étroit, que deux personnes ne peuvent s'y tenir de front. Devant moi, l'eau s'agitait comme en démence, montait, s'affaissait, et me couvrait d'une écume glacée. Je m'adossai contre une roche. Au-dessus de ma tête s'arrondissait une vaste coupole d'un bleu verdâtre: c'était le Niagara. Le bruit assourdissant finit par me causer une douleur intolérable. Je voulus m'asseoir, contempler, réfléchir: vains efforts! Une pensée, une seule, mais fixe, impérieuse, folle, m'obsédait: Imposer silence à la cataracte, empêcher les flots de tourbillonner autour de moi. Une pierre se détacha du rocher et vint tomber à mes pieds, sur le bord même de l'abîme; je me penchai pour la ramasser, puis je fis signe à mon guide que je désirais partir. Je repassai sans encombre sous la nappe d'eau et, asusitôt que je revis le ciel, je m'éntendis sur la glace et respirai longuement. Mon nègre souriait.

DAY, SAMUEL PHILLIPS. English America; or, Pictures of Canadian places and people. Lond.: T. Cautley Newby. 1864. 2:211–219. 1862 Day

"Scenes and impressions" at Niagara with special attention to the view from below the Horseshoe.

1862
Day

DAY, SAMUEL PHILLIPS. Life and society in America. Lond.: Newman. 1880. 2d ser. Pp. 26–46.

The author "visited this wonder on several occasions, and invariably with renewed impressions of awe and grandeur." He "viewed the American and the great Horse Shoe Fall from every available standpoint." He gives a good account of the scenery and deplores its profanation.

1863

1863
Maitland

MAITLAND, FREDERIC WILLIAM. Life and letters of Leslie Stephen. N. Y.: Putnam. 1906. Pp. 124–125.

Stephen thought the Falls the most beautiful sight he had ever seen and gave himself to the invention of some metaphysical speculations as to the effect of water-falls on the human mind.

1863
Russell

RUSSELL, *Sir* WILLIAM HOWARD. My diary north and south. Lond.: Bradbury and Evans. 1863. Vol. II. Pp. 98–106.

A general description of the Falls.

1864

1864
Monck

MONCK, FRANCES ELIZABETH OWEN COLE. My Canadian leaves, an account of a visit to Canada in 1864–1865. Lond.: Bentley. 1891. Pp. 159–170.

A rambling account of a visit made in October, 1864. Scenery, servants, notables, jaundice, Yankees, and *ennui* — are all jumbled together in the light gossipy style of a personal journal.

1864
Abercromby

ABERCROMBY, RALPH. Seas and skies in many latitudes; or, Wanderings in search of weather. Lond.: Stanford. 1888. Pp. 19–22.

This visitor was interested in the music of the Falls and thought that the theory that the sound is caused by air in the gorge vibrating like that in an organ pipe worth attention.

1864
Borrett

BORRETT, GEORGE TUTHILL. Letters from Canada and the United States. Lond.: Printed for private circulation by J. E. Adlard. 1865. Pp. 52–62.

The letter in question was written from Chicago in September, 1864.

Niagara to Buffalo. 1864
Borrett

CHICAGO, September 4th, 1864.

. . . . . .

Passing by a suspension bridge which connects Goat Island with the mainland, we walked to the lowest corner of the islet, and stood at once upon the brink of the precipice down which thunders the American Fall. No scene that I have ever witnessed overwhelmed me with such uncontrollable wonder as that which I looked upon, when I first stood on the margin of the plunge of the mighty cataract. The height, the power, and volume of the Falls exceeded my utmost expectations. I had been told that I should be disappointed; but if there be any who have been, I cannot conceive what their imagination could have anticipated. I own I expected more noise, but the state of the atmosphere affects that, and the roar of the Falls, like that of Bottom and Earl Russell, will at one time be as paltry and insignificant as at another it will be grand and terrifying. I should like to have the power to give you some idea of the sublimity of the scene, but it is utterly useless to attempt a description of what is wholly indescribable. The tortuous surgings of the rapids, the sudden calmness at the brow of the cataract, the majestic sea-green curve in which the liquid mass glides over the edge of the precipice, the silvery ringlets into which it is broken up soon after leaving the brink of the rock, the feathery mist in which it showers down into the cloud of spray that ever veils the last fifty feet of the Fall, and the infernal writhe and whiteness in which it reappears in the depths of the abyss,— all these wondrous features of the Queen of Cataracts must be seen, watched, sat beside for hours and days, before the mind can grasp the magnificence of the scene. But we were as yet only in sight of the American Fall. A walk along the further side of Goat Island brought us in view of the Canadian Fall, and then I found that I had been expending my fullest admiration and astonishment upon a mere thread of Niagara, the thousandth part of its volume

1864
Borrett

and grandeur, for there was before me again the same glorious scene that I have so briefly sketched; only it was a thousand times intensified.

We ascended, and took a view from every one of the numerous points from which tourists are expected to survey the Falls, and paid all those preposterous sums which tourists are invariably doomed to give — for Niagara has its excursionists by thousands, and its "look-outs," "summer-houses," "retreats," "staircases," "perilous seats," and such-like attractions for an excursion party; but it is less cockneyfied, for all that, than many a place that I have visited — less so than Chamouni and Rigi, and such favorite resorts that do not draw half so many visitors as the Falls. Having done our duty as pure excursionists, and been bled accordingly, we took a carriage and drove off to the Canadian side of the river, crossing by the famous suspension bridge which connects the British and American territories. . . .

The bridge is two miles below the falls, so that the view thence is too distant to be effective; but the drive up to them along the Canadian cliff, past "The Clifton House," the great Canadian hotel, is, I think, the most beautiful road I have ever seen. It is from this side that you get, in one grand comprehensive landscape, the whole length of the American and Canadian Falls, with the steep precipices of Goat Island between them, and the cliffs of the American bank further down the gorge, and above them the roofs, and spires, and gables of the town peering out from amid the forest that forms the background of the picture. Table Rock is a lofty shelving promontory of limestone jutting out from the Canadian shore close upon the brink of the plunge of the great Horse-shoe Fall; and there we sat, as all tourists do, and gazed in rapture at the marvels of nature unfolded, around, above, beneath us. I cannot tell you what we saw; you could not depicture it to yourself if I could. I will only say that that one view from Table Rock would repay anyone a journey from the farthest corner of the world. All the landscapes I have ever seen — all the snow-pictures of the Alps

— all the coast-scenery of the Mediterranean—all the lochs and moors of the Scotch Highlands — sink into insignificance when compared with the incomparable grandeur of Niagara. It is not the Falls themselves alone that create the magnificence of the scene; but the beauty of the landscape, of which they are the centre, adds a hundred-fold to their intrinsic splendour. The setting is worthy of the gem. But it is useless to tell you how I sat and wondered at the majesty of the view from Table Rock; you must go and stand there yourself, and then you will be amazed, as I was, at the all-absorbing interest of the scene, and ponder, as I did, upon the marvellous force and volume of the waters that every second plunge down the heights before you, and wonder whence comes the inexhaustible supply, and whither it goes, and how many a long roll of countless summers has looked on the same unvaried scene; and then you will wish, perhaps, to put down on paper some little memento of what you saw and felt, and find, I daresay, as I do, that the attempt is futile. 1864 Borrett

But a distant view of the Falls gives but a faint idea of their solemn grandeur. To comprehend them in their awe-inspiring sublimity, you must descend to the base of the cliff, and walk in amongst the spray, and under the curve of their flight down the precipice, and see the terrific power of their waters and the impotence of man beside them; in fact, you must do as I did, make the expedition to the "Cave of the Winds," and then you will have impressed upon your mind, perhaps too forcibly, the detail of the more awful properties of Niagara, which a close acquaintance can alone reveal to you.

The "Cave" lies underneath the American Fall; the trip is decidedly a perilous one, but it is "*the* thing," and so, to be fashionable, I did it. The party of adventurers consisted of eight, with a guide, a French Canadian. At a house by the foot of the Fall, we were provided with a dress, or at least an apology for a costume, the very queerest, oddest-looking, scantiest set of garments in which I have ever appeared in public. The suit

1864
Borrett

consisted of a remarkably thin threadbare flannel shirt, a much thinner and much more threadbare pair of flannel drawers, a pair of flannel socks or slippers, and a cord round the waist; the whole surmounted by an oilskin skull-cap. I never felt more like a maniac who persisted in confining his street toilette to "hat band and straps," or realized more painfully the confusing effect of the penetrating glances of half a dozen young ladies, than on the occasion when our little party in Indian file threaded the gauntlet of the inquisitive ones who had drawn up to see us enter the cave. But a bold face and buoyant spirits were necessary for the work that lay before us. After a few words of counsel from the guide about not being frightened, but keeping straight ahead, and energetic assurances that we should *not* be drowned — though we should be sure to fancy that would be the result, for everyone, he said, thought so at first — we descended some steps that led right down into the spray of the Fall, and at the bottom came upon a path or narrow ledge that wound along the cliff inside the archway of the Fall.

From the moment that we left the stairs, we got into a fine pelting rain that gradually increased in weight and volume, till it bore down upon our skull-caps like hail upon a skylight. But the cave lay on the further side of the sheet of water, through which we had to get as best we could. How that was, I cannot tell you. The guide led the way into the steam and turmoil, bending himself nearly double to keep the beating spray from his nostrils, and clinging on to the slimy rock, for the foothold was slippery and difficult. I believe I did the same, but I cannot say. The guide was immediately lost to our view; and all that I could hear, amid the thunder of the cataract beside us, was an injunction to push on when it came to the worst, for the illogical reason that it was shorter to get beyond the sheet of water than to turn back. I cannot describe to you what a terrifying scene it was — how the waters roared around us — how the stifling

spray beat upon our faces, so as to drive all the breath out of our bodies — how the wind, caused by the falling mass of water, blew about in a thousand blinding gusts (as if old Aeolus had untied every single sack, and let out the whole of his seminary for a general holiday), dashing the rain into our faces and chests, or driving it against our backs and legs, or both ways at once with equal fury — or what I did, or what I saw. I do not know where, or why, or how I went. I only know that I went down into this watery hell, and came up again uninjured, but very much out of breath and awfully frightened, half blinded, more than half deafened, and three-quarters drowned. The rest was comparatively simple — merely a scramble through the mist over slimy polished rocks, a swim across a little pool, and a climb to a chair fixed on a rugged crag, when I found myself out in front of the Fall, with a splendid view of it looking upwards before me, and, the greatest novelty of all, a circular rainbow all around me, at times too even doubled. Five minutes' rest upon the crag, and we retraced our steps — for there was no other way back again to terra firma — and then in again amongst the rain and the din of waters, more panting for breath, more struggling with the wanton gusts, more bewildering of the eye and ear, more clinging for bare life to the slimy rock, and climbing up the slippery stair-case; and so we reached the more hospitable regions of the open air, and again ran the gauntlet of the curious eyes that awaited our return to daylight — less nervous, perhaps, about their gaze, after what we had faced below, but very much more *dégagés* and disreputable. I do not know that I should care to make the expedition again, though I met one rather stout Canadian, who told me he went down regularly twice a week, under the idea that it would reduce his fat; but I am not by nature amphibious, and I consider the feat well worthy of the certificate with which the guide presents the visitors before they leave, testifying to the fact that they have "passed through the Cave of the Winds."

1864
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SALA, GEORGE AUGUSTUS. My diary in America in the midst of war. Lond.: Tinsley. 1865. 1:163–213.

Four chapters entitled, "Niagara in Winter," "After the Sunshine," "Niagara in Summer," and "A Night at Niagara," based on letters to the *Daily Telegraph* and on notes and a diary kept during 1864. The descriptions are fine and the whole account has the merit of being "different." The author has caught well the life, environment and atmosphere of the scene; his story is filled with human interest.

1865

1865
Russell

RUSSELL, WILLIAM HOWARD. Canada; its defences, condition, and resources; being a third and concluding volume of "My diary, north and south." Lond.: Bradbury and Evans. 1865. Pp. 28–52.

The author was the well-known war correspondent of the *London Times*. He writes effectively of Niagara and in an original way.

It was past noon ere the train once more began its contest with the snow — now conquering, now stubbornly resisted and brought to a standstill:— the pace exceedingly slow, the scenery that of undulating white tablecloths, the society dull.

The journey to Niagara was as unpleasant as very bad travelling and the absence of anything to see could make it. The train contained many soldiers or volunteers going back to their people, who discussed the conduct of the war with earnestness and acuteness; but though we were so far north, I could not hear any of them very anxious about the negro.

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There was little to be seen of the towns at which we halted, and our journey was continued from one to the other monotonously enough. The weary creeping of the train, the foul atmosphere, the delays, however inevitable and unavoidable, rather spoiled one's interest in the black smoky-looking cities on the white plains through which we passed; and night found us still "scrooging on," and occasionally stopping and digging out. Thus we passed by Rochester and the Genesee Falls, which seem extensively used up in mill-working, and arrived at Buffalo

(278 miles) a little before midnight. There we branched off to Niagara, which is 22 miles further on. 1865 Russell

Up to this time we had been minded to go to the Clifton House, which is on the Canadian side of the river, though it is kept by Americans, and of which we had agreeable memories in the summer, when it was the headquarters of many pleasant Southerners. There were only three or four men in our car, one of whom was, even under such hopeless circumstances, doing a little touting for an hotel at the American side. After a while he threw a fly over us and landed the whole basket. All the large hotels, he said, were shut up on both sides of the Falls, but he could take us to a very nice quiet and comfortable place, where we would meet with every attention, and it was the only house we would find open. This exposition left us no choice.

We surrendered ourselves therefore to the tout, who was a very different being from the type of his class in England: a tall, pleasant-faced man, with a keen eye and bronzed face, ending in an American Vandyke beard, a fur collar round his neck, a heavy travelling coat — from which peered out the ruffles of a white shirt, and a glittering watch-chain — rings on his fingers, and unexceptionable shoeing. He smoked his cigar with an air, and talked as if he were conferring a favour. "And I tell you what! I'll show you all over the Falls to-morrow. Yes, sir!" Why, we were under eternal obligations to such a guide, and internally thanking our stars for the treasure-trove, at once accepted him.

At the gloomy deserted station we were now shot out, on a sheet of slippery deep snow, an hour after midnight. We followed our guide to an hostelry of the humbler sort, where the attention was not at first very marked or the comfort at all decided. The night was very dark, and a thaw had set in under the influence of a warm rain. The thunder of the Falls could not be heard through the thick air, but when we were in the house a quiet little quivering rattle of the window-panes spoke of its influence. The bar-room was closed — in the tawdry foul-

1865 Russell

odoured eating-room swung a feeble lamp: it was quite unreasonable to suppose that any one could be hungry at such an hour, and we went to bed with the nourishment supplied by an anticipation of feasting on scenery. All through the night the door and window-frames kept up the drum-like roll to the grand music far away.

We woke up early. What evil fortune! Rain! fog! thaw! — the snow melting fast in the dark air. But were we not "bound" to see the Falls? So after breakfast, and ample supplies of coarse food, we started in a vehicle driven by the trapper of the night before. He turned out to be a very intelligent, shrewd American, who had knocked about a good deal in the States, and knew men and manners in a larger field than Ulysses ever wandered over.

The aspect of the American city in winter time is decidedly quite the reverse of attractive, but there was a far larger fixed population than we expected to have seen, and the fame of our arrival had gone abroad, so that there was a small assemblage round the stove in the bar-room and in the passage to see us start. I don't mean to see us in particular, but to stare at any three strangers who turned up so suspiciously and unexpectedly at this season. The walls of the room in the hotel were covered with placards, offering large bounties and liberal inducements to recruits for the local regiment of volunteers; and I was told that a great number of men had gone for the war after the season had concluded — but Abolition is by no means popular in Niagara.

It was resolved that we should drive round to the British side by the Suspension Bridge, a couple of miles below, as the best way of inducting my companions into the wonders of the Falls; and I prepared myself for a great surprise in the difference between the character of the scene in winter and in summer.

For some time the road runs on a low level below the river bank, and does not permit of a sight of the cataract. The wooden huts of the Irish squatters looked more squalid and miserable than they were when I saw them last year — won-

derful combinations of old plank, tarpaulin, tinplate, and stove pipes. "It's wonderful the settlement doesn't catch fire!" "But it does catch fire. It's burned down often enough. Nobody cares: and the Irish grin, and build it up again, and beat a few of the niggers, whom they accuse of having blazed 'em up. They've a purty hard time of it now, I think." 1865 Russell

There are too many free negroes and too many Irish located in the immediate neighbourhood of the American town, to cause the doctrines of the Abolitionists to be received with much favour by the American population; and the Irish of course are opposed to free negroes, where they are attracted by paper-mills, hotel service, bricklaying, plastering, housebuilding, and the like — the Americans monopolizing the higher branches of labour and money-making, including the guide business.

At a bend in the road we caught a glimpse of the Falls, and I was concerned to observe they appeared diminished in form, in beauty, and in effect. The cataract appeared of an ochreish hue, like bog-water, as patches of it came into sight through breaks in the thick screen of trees which line the banks. The effect was partly due to the rain, perhaps, but was certainly developed by the white setting of snow through which it rushed. The expression on my friends' faces indicated that they considered Niagara an imposition. "The Falls are like one of our great statesmen," quoth the guide, "just now. There's nothing particular about them when you first catch a view of them; but when you get close and know them better, then the power comes out, and you feel small as potatoes."

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The country, which I remembered so riant and rich, now was cold and desolate. At the station, near the beautiful Suspension Bridge — which one cannot praise too much, and which I hope may last forever, though it does not look like it — the houses had closed windows, and half of them seemed empty, but the German proprietors no doubt could have been found in the lager-beer saloons and billiard-rooms. The toll-takers and revenue

1865 Russell officers on the bridge showed the usual apathy of their genus. No novelty moves them. Had the King of Oude appeared with all his court on elephants, they would merely have been puzzled how to assess the animals. They were not in the least disconcerted at a group of travellers visiting the St. Lawrence in winter time.

The sight of the St. Lawrence as we crossed over, roaring and foaming more than a hundred feet below us, and rushing between the precipitous banks on which the bridge rests, gave one a sort of "*frisson:*" it looked like some stream of the Inferno — the waters, black and cold, lashed into pyramids of white foam, and seeming by their very violence to impede their own escape. Some distance below the bridge, indeed, they rise up in a visible ridge, crested with high plumes of tossing spray; but it is related as a fact that the steamer "Maid of the Mist," which was wont to ply as a ferry-boat below the Falls, was let down this awful sluice by a daring captain, who sought to save her from the grip of certain legal functionaries, and that she got through with the loss of her chimney, after a fierce contest with the waters, in which she was whirled round and buffeted almost to foundering. At that moment the men on board would no doubt have surrendered to the feeblest of bailiffs for the chance of smooth water.

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It is above all things noteworthy, perhaps, that the Americans in all their wars with the mother-country have sought to strike swift hard blows in Canada, and that hitherto, with every advantage and after considerable successes, they have been driven, weather-beaten back, and bootless home. It was actually on the land shaken by the roar of these falling floods that battles have been fought, and that the air has listened in doubt to the voice of cannon mingling with the eternal chorus of the cataract.

There are here two points at which Canada lies open to the invader. The first lies above the Rapids — the latter is below

them, where the St. Lawrence flows into the lake. Three considerable actions and various small engagements have taken place on the Canadian side of the river, all of which were characterized by great obstinacy and much bloodshed. Let us consider them, and see what can or ought to be done in order to guard the tempting bank which offers such an excellent base of operations for future hostile occupation. 1865 Russell

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This yawning gap is barrier enough between the two countries should they ever, unhappily, become belligerent, but the banks can be commanded by either; and in case of war the bridge would no doubt be sacrificed by one or other, as well as the grander structure at Montreal would be, without some special covenant.

When still a mile and a half away, a whirling pillar of a leaden gray colour, with wreaths of a lighter silvery hue playing round it, which rose to the height of several hundred feet in the air, indicated the position of the Falls. The vapour was more solid and gloomy-looking than the cloudlike mantle which shrouds the cataract oftentimes in the summer. I doubt if there is a very satisfactory solution of its existence at all. Of course the cloud is caused by particles of water thrown up into the atmosphere by the violent impact of the water on the surface, and by the spray thrown off in the descent of the torrent; but why those particles remain floating about, instead of falling at once like rain, is beyond my poor comprehension. Sure enough, a certain portion does descend like a thick Scotch mist: why not all? As one of my companions, with much gravity and an air of profound wisdom, remarked last summer, " It's probable electricity has something to do with it! " Can any one say more?

Assuredly, this ever-rolling mighty cloud draping and overhanging the Falls adds much to their weird and wonderful beauty. Its variety of form is infinite, changing with every current of air, and altering from day to day in height and volume; but I never looked at it without fancying I could trace in the

1865 Russell

outlines the indistinct shape of a woman, with flowing hair and drooping arms, veiled in drapery — now crouching on the very surface of the flood, again towering aloft and tossing up her hands to heaven, or sinking down and bending low to the edge of the cataract, as though to drink its waters. With the aid of an active fancy, one might deem it to be the guardian spirit of the wondrous place.

The wind was unfavourable, and the noise of the cataract was not heard in all its majestic violence; but as we came nearer, we looked at each other and said nothing. It grew on us like the tumult of an approaching battle.

There is this in the noise of the Falls: produced by a monotonous and invariable cause, it nevertheless varies incessantly in tone and expression. As you listen, the thunder peals loudly, then dies away into a hoarse grumble, rolls on again as if swelled by minor storms, clangs in the ear, and after a while, like a river of sound welling over and irrepressible, drowns the sense in one vast rush of inexpressible grandeur — then melts away till you are almost startled at the silence and look up to see the Falls, like a green mountain-side streaked with fresh snowdrifts, slide and shimmer over the precipice.

It may well be conceived with what awe and superstitious dread honest Jesuit Hennepin, following his Indian guides through the gloom of the forest primeval, gazed on the dreadful flood, which had then no garniture of trimmed banks, cleared fields, snug hotels, and cockney gazabos to alleviate the natural terror with which man must gaze on a spectacle which conjures up such solemn images of death, time, and eternity.

No words can describe the Falls; and Church's picture, very truthful and wonderful as to form, cannot convey an idea of the life of the scene — of the motion and noise and shifting colour which abound there in sky and water. I doubt, indeed, if any man can describe his own sensations very accurately, for they undergo constant change; and for my own part I would say that the effect increases daily, and that one leaves the scene with more

vivid impressions of its grandeur and beauty than is produced by the first *coup-d'oeil.* 1865 Russell

A gradual approach does not at all diminish the power of the cataract, and the mind is rather unduly excited by the aspect of the Styx-like flood — black, foam-crested, and of great volume, with every indication of profound depth — which hurries on so swiftly and so furiously below the road on which you are travelling, between banks cut down through grim, dark rock, so sheer that the tops of the upper trees which take root in the strata can be nearly touched by the traveller's stick. The idea that the whole of the great river beneath you has just leaped over a barrier of rock prepares one's conception for the greatness of the cataract itself.

In summer time there were wild ducks flying about, and terns darted up and down the stream. Now it was deserted and desolate, looking of more inky hue in contrast with the snow. Close to the boiling cataract the fishermen's tiny barks might then be seen rocking up and down, or the angler sought the bass which loves those turbulent depths; but no such signs of human life and industry are visible in winter.

Before Niagara was, odd creatures enough lived about here, which can now be detected fossilized in the magnesian limestone. How many myriads of years it has been eating away its dear heart and gnawing the rock, let Sir Charles Lyell or Sir Roderick Murchison calculate; but I am persuaded that since I saw it some months ago there has been a change in the aspect of the Horseshoe Fall, and that it has become more deeply curved. The residents, however, though admitting the occurrence of changes, say they are very slow, and that no very rapid alteration has taken place since the fall of a great part of Table Rock some years ago; but masses of stone may be washed away every day without their knowing it.

One very natural consequence of a visit in the winter was undeniable — that the Falls were visibly less; they did not extend so far, and they rolled with diminished volume. The water did

1865
Russell

not look so pure, and incredible icicles and hanging glaciers obscured the outlines of the rocks, and even intruded on the watercourse; whilst the trees above, laden with snow, stood up like inverted icicles again, and rendered it difficult to define the boundary between earth, air, and water.

A noiseless drive brought us to the village. Clifton House was deserted — the windows closed, the doors fastened. No gay groups disported on the promenade; but the bird-stuffer's, the Jew's museum, the photographer's shed, the Prince's triumphal arch, were still extant; and the bazaars, where they sell views, sea-shells, Indian beadwork and feathers, moccasons, stuffed birds, and the like, were open and anxious for customers. Our party was a godsend; but the worthy Israelite, who has collected such an odd museum here — one, under all the circumstances, most creditable to his industry and perseverance as well as liberality — said that travellers came pretty often in fine winter weather to look at the cataract. We walked in our moccasons to the Table Rock, and thence to the verge of the Falls, and gazed in silence on the struggling fury of the terrible Rapids, which seem as if they wrestled with each other like strong men contending against death, and fighting to the last till the fatal leap must be made.

The hateful little wooden staircases, which like black slugs crawl up the precipice from the foot of the Falls, caught the eyes of my companions; and when they were informed that they could go down in safety and get some way behind the Fall itself, the place was invested with a new charm, and ice, rheumatism, and the like, were set at defiance. I knew what it was in summer, and the winter journey did not seem very tempting; but there was no alternative, and the party returned to the museum to prepare for the descent.

Whilst we were waiting for our waterproof dresses to go under the Falls, we had an opportunity of surveying the changes produced by winter, and I was the more persuaded that the effect is not so favorable as that of summer. The islands are

covered with snow — that which divides the sweep of the cataract looking unusually large; the volume of water, diminished in the front, is also deprived of much of its impressive force by a decrease in the sound produced by its fall. The edges of the bank, covered with glistening slabs of ice, were not tempting to the foot, and could not be approached with the confidence with which they are trod by one of steady nerves when the actual brink is visible. 1865 Russell

There were some peculiarities, however, worthy of note; and in a brighter day, possibly the effect of the light on the vast ranges of icicles, and on the fantastic shapes into which the snow is cut on the rocks at the margin of the waters, might be very beautiful. These rocks now looked like a flock of polar bears, twined in fantastic attitudes, or extended singly and in groups by the brink as if watching for their prey. Above them rose the bank, now smooth and polished, with a fringe of icicles — some large as church steeples; above them, again, the lines of the pine-trees, draped in white, and looking like church steeples too. At one side, near Table Rock, the icicles were enormous, and now and then one fell with a hissing noise, and was dashed on the rock into a thousand gliding ice arrows, or plunged into the gulf.

By this time our toilette-room was ready, and each man, taking off his overcoat, was encased in a tarpaulin suit with a sou'-wester. In this guise we descended the spiral staircase, which is carried in a perpendicular wooden column down the face of the bank near Table Rock, or what remains of it, to the rugged margin, formed of boulders now more slippery than glass.

Our guide, a strapping specimen of negro or mulatto, in thick solid ungainly boots, planted his splay feet on them with certainty, and led us by the treacherous path down towards the verge of the torrent, which now seemed as though it were rushing from the very heavens. On our left boiled the dreadful caldron from which the gushing bubbles, as if overjoyed to escape, leaped up, and with glad effervescence rushed from the abyss which plummet never sounded. On our right towered the sheer precipice

1865
Russell

of rock, now overhanging us, and garnished with rows of giant teeth-like icicles.

After a slow cautious advance along this doubtful path, we perceived that the thin edge of the cataract towards which we were advancing shot out from the rock, and left a space between its inner surface and a black shining wall which it was quite possible to enter. There was no wind, the day was dull and raw, but the downright rush of the water created a whirling current of air close to it which almost whisked away the breath; and a vapour of snow, fine sleet, and watery particles careered round the entrance to the recess, which no water kelpie would be venturesome or lonesome enough to select, except in the height of the season.

On we thus went, more and more slowly and cautiously, over the polished ice and rock, till at last we had fairly got behind the cataract, and enjoyed the pleasure of seeing the solid wall of water falling, falling, falling, with the grand monotony of eternity, so nigh that one fancied he could almost touch it with his hand. When last I was here, it was possible to have got as far as a ledge called Termination Rock; but the ice had accumulated to such an extent that the guide declared the attempt to do so would be impracticable or dangerous, and indeed where we stood was not particularly safe at the moment. As I was in the cave, gazing at the downpoured ruin of waters with a sense of security as great as that of a trout in a mill-race, an icicle from the cliff above cracked on the rocks outside, and threw its fragments inside the passage. I own the desire I had to get on still further and pierce in behind the cataract, where its volume was denser, was greater than the gratification I derived from getting so far. But we had reached our *ultima thule*, and, with many a lingering look, retraced our steps — now and then halting to contend the better with the gusts from the falls, which threaten to sweep one from the ledge. If the foot once slipped, I cannot conceive a death more rapid: life would die out with the thought, " I am in the abyss! " ere a cry could escape.

Whilst returning, another icicle fell near at hand; therefore it is my humble opinion that going to Termination Rock in winter is not safe except in hard frost, the safer plan being not to go at all. And yet no one has ever been swept or has slipped in, I believe, and so there is a new sensation to be had very easily. The path on our return seemed worse than it was on our going — a very small slippery ridge indeed between us and the gulf; but danger there can be but little. As we emerged from the wooden pillar, we submitted to a photographer for our portraits in waterproof. 1865 Russell

Poor man! In summer he has a harvest, perhaps; in winter he gleans his corn with toil and sorrow, making scenes for stereoscopes. I am not aware that we omitted anything proper to be done; for we purchased feather fans — the griffs did — and beadwork and other "mementos of the Falls," which are certainly not selected for any apposite quality. As if the Falls needed a bunch of feathers and beads to keep them in remembrance! Well, many a time has a lock of hair, a withered flower, the feeblest little atom of substantial matter, been given as a memento ere now, and done its office well.

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The Canadian side of the Falls boasts of charming scenery. Even in the snow, the neat cottages and houses — the plantations, gardens, and shrubberies — evince a degree of taste and comfort which were not so observable on the American side, notwithstanding the superior activity of the population.

Our observations on our return to the right bank of the river confirmed my impression concerning the diminished volume and effect of the cataract. The ice, formed by spray, hung over the torrent, which, always more broken and less ponderous than that on the other side, is in summer very beautiful, by reason of the immense variety of form and colour in the jets and cascades, and of the ease with which you can stand, as it were, amid the very waters of Niagara.

The town half populated — the monster hotel closed — the

1865
Russell

swimming-baths, in which one could take a plunge into the active rapids safely enclosed in a perforated room, now fastened up for the winter,— presented a great contrast to the noise and bustle of the American Niagara in the season. This is the time when the Indians enable the shopkeepers to accumulate their stores of bead and feather work; and a few squaws, dressed in a curious compromise between the garments of the civilized female and the simpler robes of the "untutored savage," flitted through the snow from one dealer to another with their work. In some houses they are regularly employed all day, and come in from their village in the morning, and go home at night when their work is done.

The view of the Rapids from the upper end of Goat Island is not, to my mind, as fine as that obtained from the island on the British side, higher up. The sight of that tortured flood, loaded with its charging lines of "sea horses,"— its surging glistening foam-heaps streaking the wide expanse which rolled towards us from a dull leaden horizon,— was inexpressibly grand and gloomy, and struck me more forcibly than the aspect of the Rapids had done in August, when I beheld them in a setting of rich green landscape and forest.

On the whole, I would much rather, were I going to Niagara for the first time, select the Canadian side for my first view. It would be well never to look at the Falls, if that were possible, till the traveller could open his eyes from the remnant of the Table Rock on the Great Horseshoe; but curiosity will probably defeat any purpose of that kind. Still, the Horseshoe is grand enough to grow on the spectator day after day, even if there be some disappointment in the first aspect. . . . As the voice of a man can be heard in the din of battle by those around him, so can even the low tones of a clear speaker be distinguished most readily close to the brink of a cataract, the roar of which at times is very audible, nevertheless, from twelve to fifteen miles away.

The only drawback to a sojourn on the Canadian side is, per-

haps, the feeling of irritation or unrest produced by the ceaseless jar and tumult of the Falls, which become well nigh unbearable at night, and vex one's slumbers with unquiet dreams, in which water plays a powerful part. The American side is not so much affected in that way. The Horseshoe presents by far the greatest mass of water; its rush is grander — the terrible fathomless gulf into which it falls is more awe-inspiring than anything on the American side; but the latter offers to the visitor greater variety of colour — I had nigh said of substance — in the water. At its first tremendous blow on the seething surface of the basin, the column of water seems to make a great cavern, into which it plunges bodily, only to come up in myriad millions of foaming particles, very small, bright, and distinct, like minute, highly polished shot. These gradually expand and melt into each other after a wild dance in the caldron, which boils and bubbles with its awful hell-broth forever. In the centre of the Horseshoe, which is really more the form of two sides of an obtuse-angled triangle, the water, being of great depth — at least thirty feet where it falls over the precipice — is of an azure green, which contrasts well with the yellow, white, and light emerald colours of the shallower and more broken portions nearer the sides. 1865 Russell

It would be considered rather presumptuous in any one to think of improving upon Niagara, but I cannot help thinking that the effect would be increased immensely if the island which divides the cataract into the Horseshoe and the American Falls, and the rock which juts up in the latter and subdivides it unequally, were removed or did not exist; then the river, in one grand front of over one thousand yards, would make its leap *en masse*. The American Falls are destitute of the beauty given by the curve of the leap to the Horseshoe; they descend perpendicularly, and are lost in a sea of foam, not in an abyss of water, but in the wild confusion of the vast rocks which are piled up below. But they are still beautiful exceedingly, and there is more variety of scene in the islands, in the passage over the bridges to Goat Island and to the stone tower, which has been

1865 Russell

built amid the very waters of the cataract, so that one can stand on the outside gallery and look down upon the Falls beneath.

Goat Island is happily intersected with good drives and walks, laid out with sufficiently fair taste through the natural forest, and seats are placed at intervals for the accommodation of visitors. It is no disparagement to the manner in which the grounds have been ornamented to say that a good English landscape gardener would convert the island into the gem of the world. The ornamentation need not be overdone; it should be congruous and in keeping with the Falls, which nature has embellished with such infinity of colouring. As it is, the island is much visited. Strange enough, the softest whispered vows can be heard amid the thunder of Niagara, and it is believed that many marriages owe their happy inspiration to inadvertent walking and talking in these secluded yet much-haunted groves. Sawmills, papermills, and manufactories delight the utilitarian as he gazes on the Rapids which have so long been wasting their precious waterpower, and it is not unlikely that a thriving town may grow up to distressing dimensions on the American side of the stream, at all events.

1866

1866 Comettant

COMETTANT, JEAN PIERRE OSCAR. Voyage pittoresque et anecdotique dans le Nord et le Sud des Etats-Unis d'Amerique. Paris: 1866. Pp. 146–170.

Comparison of Niagara in the time of Chateaubriand and today. Account of the drainage area and volume, and the Indians and their goods. The writer saw the Falls from above and below and on both sides. He went behind the sheet and through the cave of the winds. He gives the tales of the Hermit of the Niagara, of Blondin, Sam Patch, the Michigan, etc. The account contains a view of the Horseshoe Fall designed by J. Noel and engraved by Outhwaite.

1867

1867 Butler

BUTLER, W. F. The great lone land; a narrative of travel and adventure in the north-west of America. Lond.: Low, Marston, Low, Searle. 1872. P. 25.

No attempt at description of the scenery, but in-season activities are contrasted with January desolation.

1866–1867

DILKE, *Sir* CHARLES WENTWORTH. Greater Britain. A record of travel in English-speaking countries during 1866–7. . . . Phila.: Lippincott. 1869. 1:69. 1866–67 Dilke

A comparison of Chaudiére and Niagara by one who questions whether any fall can be sublime. The author thinks that "Niagara has one beauty in which it is unapproached by the great Chaudiére: the awesome slowness with which the deep-green flood, in the centre of the Horseshoe Fall, rolls rather than plunges into the gulf." The account is interesting because of the author's point of view, even though he treats of Niagara only incidentally.

1867

LATHAM, HENRY. Black and white. A journal of a three months' tour in the United States. Lond.: Macmillan. 1867. Pp. 221–229. 1867 Latham

The author spent two days at the Falls in March, 1867. In his own words, "the majesty of the slow descending curve of the great wave is inexpressible."

> The majesty of the slow descending curve of the great wave is inexpressible. . . . You watch the Falls until they fascinate you. You feel as if you were sitting at the spectacle of a vast tragedy, in which Crime and Flight, and Terror and Loathing, and Destiny and Power, and Death and Chaos, are all playing inarticulate parts. . . . In spite of frost and snow, we hung about the Falls for two whole days. . . .

ZINCKE, F. BARHAM. Last winter in the United States, being table talk collected during a tour through the late Southern Confederation, the far west, the Rocky mountains. . . . Lond.: John Murray. 1868. Pp. 263–268. 1867 Zincke

The author seems to prefer Niagara in its winter dress.

1868

FORSTER, JOHN. Life of Charles Dickens. Phila.: J. B. Lippincott. 1872–1874. 1:404–405; 3:433. 1868 Forster

Two letters, one written in April, 1842, the other in March, 1868. The first contains what is undoubtedly the rough draft from which was evolved the much quoted description of the Falls. The letter is in intimate, friendly style, and in very personal fashion. In the second letter Dickens

1868 Forster writes: "We went everywhere at the Falls, and saw them in every aspect. . . . Nothing in Turner's finest water-colour drawings, done in his greatest day, is so ethereal, so imaginative, so gorgeous in colour, as what I then beheld. I seemed to be lifted from the earth and to be looking into Heaven."

1868 Rose ROSE, GEORGE. The great country; or, Impressions of America. Lond.: Tinsley Bros. 1868. Pp. 266–271.

A short account of a few days spent in the immediate neighborhood of the cataract.

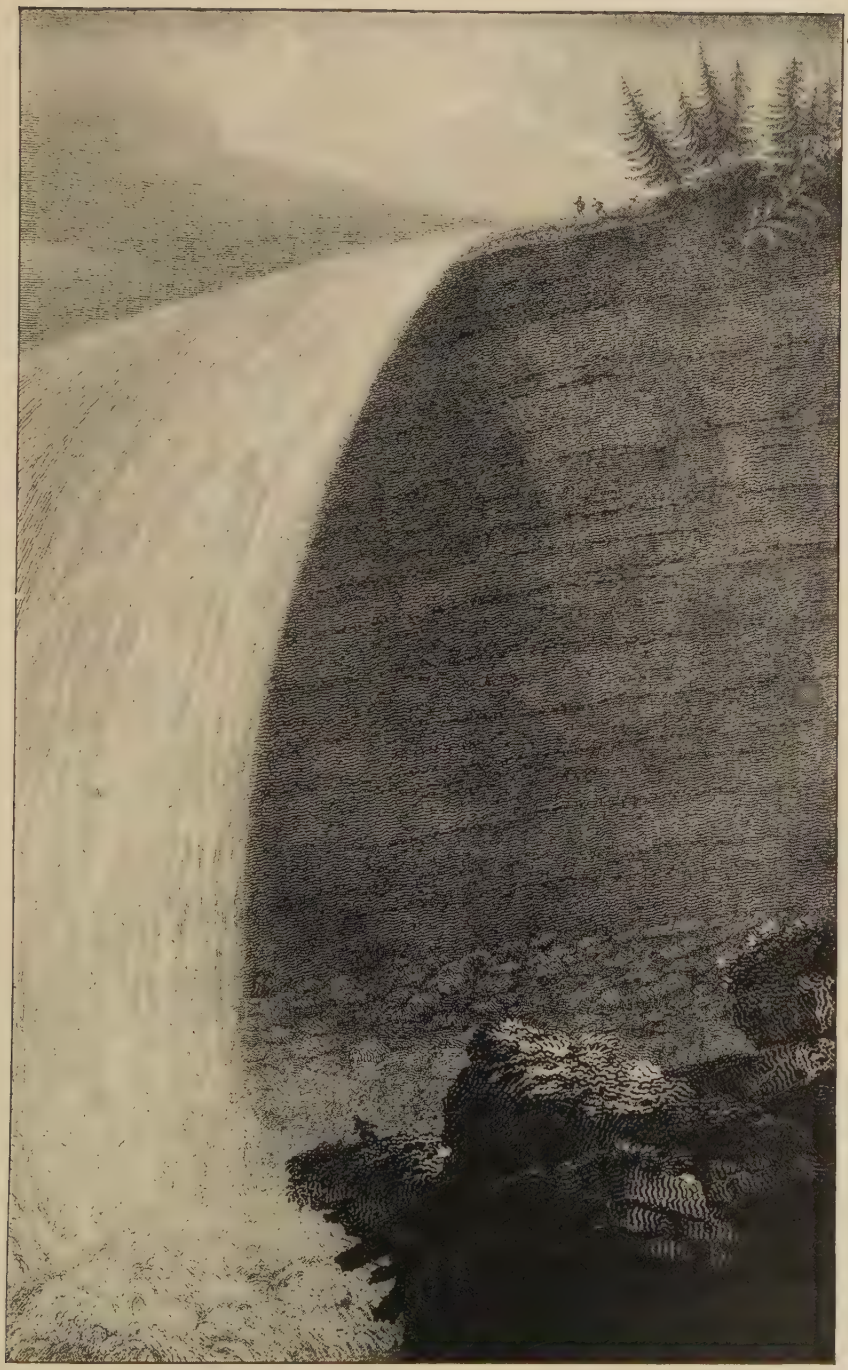
1868 Townsend TOWNSEND, FREDERICK TRENCH. Ten thousand miles of travel, sport, and adventure. Lond.: Hurst and Blackett. 1869. Pp. 57–59.

An appreciative account of a September visit.

1869

1869 Chester CHESTER, GREVILLE JOHN. Transatlantic sketches in the West Indies, South America, Canada, and the United States. Lond.: Smith, Elder. 1869. Pp. 279–282.

I was prepared for unequalled *grandeur*, but I was not prepared for the astonishing *beauty* of the great Falls and their surroundings. The rapids above the descent, the huge ridges of seething water, the rocky fir-clad islets, with their woods and wild flowers, the rainbow-traversed clouds of spray, the black rocks which bound the whirlpool below: these, with the Falls themselves — those ever-moving, motionless, changeless, yet ever-changing walls of deep sea-green water, do indeed make up a scene of matchless beauty, such as can nowhere else be found. Standing on the brink of the Canada Fall and gazing into the center of the great "horseshoe," where monotony and continuity seem to strive with ever-varying progress, the mind is affected with the deepest sense of peace and repose, and seems to catch the reflected image of Eternity itself. Deep, too, and deeply impressive as are the voices of these many waters, painful and oppressive they nowhere are; and these, too, speak peace to the soul.



View of the Great Pitch Taken from Below
Sketched by A. Wilson; engraved by George Cooke, 1810

1870

HUGHES, THOMAS. Vacation rambles. Lond.: Macmillan. 1895. Pp. 146–150. 1870 Hughes

An intimate, gossipy letter, but without, on the whole, a great deal about the Falls. The author went behind the Falls at night and saw the moon through the falling waters. He writes an interesting description of the current baths in the rapids.

We had a bath in the rush just above the Falls; you have a little room through which a slice some four feet wide of the water is allowed to rush, . . . and let the water seize and tear at you, which it does with a vengeance, tugging as if it would carry off your legs and pull you in two in the middle. You can get out of it in a moment by just slewing yourself round, and the sensation is marvelously delicious.

1871

MARSHALL, CHARLES. The Canadian dominion. Lond.: Longmans, Green. 1871. Pp. 85–92. 1871 Marshall

A fine description of the Falls. Of his trip behind the Falls on a moonlight night, the author says: "It was a spectacle never to be forgotten." His clear impressions of the accessibility of the Falls are quoted below.

It is one of the delightful peculiarities of the Niagara Falls that you may walk with perfect safety along the brink of the waters, either on the mainland or on the islands that rise from the flood just before it leaps the abyss. You can stoop and cool your hand in the clear water at the very instant it falls from sight. You may stand on the smooth limestone over which the waters roll when a west wind blows, and look straight down into the falling flood at your side. You may touch with your cane the rock over which the flood is passing, then, letting go, see it instantly disappear. It will come up to the surface of the river at the whirlpool probably, three miles down the river.

The beautiful stream permits itself to be toyed with. Its

1871 Marshall

smiling accessibility is most alluring, but is most dangerous. Every rock and ledge has its story of the fatal attraction of the waters.

1873

1873 Geikie

GEIKIE, CUNNINGHAM. Life in the woods. Lond.: Strahan. 1873. Pp. 347–371.

The author viewed the Falls from all the various points of interest and was much struck with the rapids. In his own words: "It is no use attempting to picture the scene. . . . You cannot see Niagara at once; it takes day after day to realize its vastness."

1873 Nichols

NICHOLS, T. L. Forty years of American life. 2d ed. Lond.: Longmans, Green. 1874. Pp. 204–205.

"It is too big a thing to put into words or on canvas," says the author. That is perhaps the reason that he does not attempt to describe the Falls but puts his remarks about them in a chapter on "Recreations and Amusements" and gives his attention to dinner at the International Hotel.

1873 Tyndall

TYNDALL, JOHN. Niagara (Macmill. May, 1873. 28:49–62.) A discourse delivered before the Royal Institution, April 4, 1873.

1874

1874 Morris

MORRIS, WILLIAM. Letters sent home. Out and home again by way of Canada and the United States; or, What a summer's trip told me of the people and the country of the great West. Lond.: F. Warne. N. Y.: Scribner, Welford, and Armstrong. (1875.) Pp. 220–235.

The Niagara chapter, though of considerable length, is of no special value.

1874 Rochefort

ROCHEFORT, HENRI. The adventures of my life. Arranged for English readers by the author and Ernest W. Smith. Lond. and N. Y.: E. Arnold. 1896. 2:154–155.

O'Kelly took a place in our waggon and accompanied us to Niagara, which, he said, it would be almost criminal to have passed without stopping to visit. All around the Falls — which are really majestic, though one feels inclined to believe that they have been put there to attract foreigners of every nationality — is a perpetual sort of St. Cloud fête.

The banks on the sides of the rapids are crowded with pedlars and even fair-stalls. Everything is on sale — especially bracelets of German lapis-lazuli and Vesuvian lava; that is to say, the products of numerous industries that have nothing to do with Niagara and its Falls. This bazaar-like and caravan serail aspect takes much of the grandeur from the spectacle. A wild-beast showman absolutely insisted on my purchasing a bear, which turned sadly about in its cage just as I had done in mine only a few months earlier! Despite the resemblance of our misfortunes, I had to regret not being able to deliver this prisoner, whose first act would possibly have been to devour its liberator. Such things do happen; especially in politics. 1874 Rochefort

We were overloaded with photographs. Clifton Hotel, where we lodged, is built at the end of a suspension bridge. From the centre of this the spectator has a splendid spot whence to contemplate the grand cascade, which finishes by giving you the impression of being an immense stick of marsh mallow or barley sugar twisting round a bobbin of an Algerian stall at a suburban fair. The hotel proprietor immediately brought us the inevitable *in-folio*, in which his clients are practically forced to sing the praises — as in the *Voyage de M. Perrichon* — of the splendour of the scene and the excellence of the hotel cooking. He did not seem to have recognized us, and as the preparation of my article imposed solitude and incognito, I contented myself with tracing this burlesque phrase on the register that was open for my meditations —

"This fall is profound, but my own is still greater!

"(Signed) THE SHADOW OF NAPOLEON III."

The author, who was returning to France after having escaped from the penal colony of New Caledonia, writes in characteristic fashion of his sojourn at Niagara.

1875

The Falls of Niagara. (Harp. w. Sept. 11, 1875. 19:739–741.) 1875

A general description, which laments the "prosaic adjuncts of civilization" in the vicinity of the Falls.

1875 Offenbach

OFFENBACH, JACQUES. America and the Americans. Lond.: William Reeves. (1877.) Pp. 74–75.

Offenbach was by his own account much affected at the sight of the Falls. "The sight of this vast amphitheatre," he writes, "of this prodigious mass of water, falling with a report of thunder, like the sound of a great earthquake, produced in me a vertigo, and caused me to forget all I had read, all I had heard, and all my fancy had imagined." Like many another traveler, he was much annoyed by pedlars and guides.

1875 Thorold

THOROLD, *Rev.* A. W. To Niagara and back. Pt. 2. (Good words. 1875. 16:125–131.)

As to the abiding impression left on me by Niagara, this certainly I can say, that of all the glorious things in God's creation I have been permitted to see in the four quarters of the globe — and they have not been few — Niagara comes first. On various minds it leaves various impressions; and perhaps this is significative of its real power. To Charles Dickens, for instance, it gave the thought of peace. My own impression of it is not perhaps so much embodied in any one distinct idea, as in a sort of many-sided quiet yet rapturous enjoyment that possessed me about it. It made me so wonderfully happy to see it then; it still makes me so happy to recollect it now. There is its color, as it falls, so dazzingly white before it falls, so exquisitely green, the greenness of emeralds. There is its motion, forever going on, day and night, summer and winter, year after year, age after age; the very embodiment and idea of quiet but irresistible power, wearing away the rocks, defying the wind to drive it back, and the frost to congeal it, with always the same volume of water, in heat or cold, in drought or rain. It is changing every moment, yet it is everlasting, ever bringing down fresh fountains from the lakes and hills of the north; in its actual substance different moment by moment. Yet for almost infinite years before the first human foot trod those woodland solitudes, or human face gazed tremblingly down on its awful beauty, it has been rolling on, unseen except by its Maker, towards the distant sea. And then its sound! The wonderful thing is that it does not sound

more. No doubt when you are close to it, there is a vast majesty in its deep roar; but it is never grating, or harsh, or startling; never a sound of terror, though it is indeed a voice of strength. Sweet, penetrating, winning rather than forcing its presence on you, it lulls you gently to sleep, as you listen to it from afar. And if I may so express myself without irreverence, I seemed while listening to it to understand as with a new intelligence how the Apostle John must himself have been listening with a like lingering rapture to the soft sweet music of some distant cataract, when writing by the Spirit of God about Him, who is Himself God's word and mouth-piece, he said "His voice was as the sound of many waters." 1875 Thorold

. . . . .

My stay at the Falls was short, but, if measured by the new thoughts, and the deep fresh happiness they gave, it was a thing of months, nay, years. Like all other sorts of happiness, it must be interrupted and finished; yet, when once possessed, it never can be all lost. Sitting by the fire, walking in the noisy streets, sleepless, or careworn, he who has once been to Niagara can, by an act of will turn his memory westward, and he is there again.

. . . . .

THOROLD, *Rev.* A. W. To Niagara. Pt. 1. (Good words. 1875. 16:63–69.)

In this article the author gets as far as Toronto, on the way to Niagara.

1876

FERREE, J. W. The Falls of Niagara and scenes around them. N. Y.: A. S. Barnes and Co. 1876. 1876 Ferree

A detailed description of Niagara from all points of view and under every aspect.

HOLLEY, GEORGE W. Niagara. (Scrib. Aug. 1876. 12:462–478.) 1876 Holley

Compressed into the limits of a magazine article are a description of the cataract and some of its physical features, some account of the local history of the region, accidents and incidents connected with the Falls and a description of the beauty of the winter scenery.

1877

1877 Nash NASH, WALLIS. Oregon: there and back in 1877. . . . Lond.: Macmillan. 1878. Pp. 264–271.

In the words of the author: "It is right to apologize for saying one word about Niagara, since to most readers it must be assumed to be familiar from their earliest years, still to pass it by in silence would be almost to insult it." His account is lightly, but, nevertheless, well done.

1877 Vivian VIVIAN, HUSSEY H. Notes of a tour in America, from August 7th to November 17th, 1877. Lond.: Stanford. 1878. Pp. 36–40.

It impressed me with a sense of its own grandeur, and of the impotence of man, more than anything I ever saw. . . .

To convey an impression in the least degree adequate appears to me impossible. If to be viewed in a material sense, let the Engineer take his formula and calculate the equivalent of two million tons of water per minute, say 35,000 tons per second, falling from a height of 160 feet; and then let him say how many miles of locomotives, or how many first class ocean steam engines, or how many tons of "Ocean" steam coal the material force of Niagara represents. . . . Or, to view it from an aesthetic point, imagine a sea of raging waters, perhaps a mile and a half wide, dashing over ledges of rock, foaming, tossing its billows high into the air — on which no living thing floats, on which no living thing has ever floated and lived — rushing madly down a steep incline, suddenly contracted by the curving western shore into perhaps one third of its former width, and then leaping with one tremendous bound over a precipice of 160 feet; where shallow, broken at once into foam, but where deep (for perhaps 150 yards in width in the centre of the Fall) holding together in one green mass, for some sixty feet, and then separating into a seething veil of purest white, the whole volume dashing on to the rocky beach below, its contact lost in thickest vapours, then emerging, churned into snow-white foam which circles round and round for ever and for ever beneath the cataract, deafening with its roar, drenching all around with its spray, a column of white vapour rising high into the sky and floating

away (as I saw it last night from a distance) like a summer cloud. Imagine all this, and you have still the weakest and faintest idea of Niagara. 1877 Vivian

1877–1878

SAUNDERS, WILLIAM. Through the light continent; or, The United States in 1877–1878. 2d ed. Lond.; N. Y.: Cassell, Petter, Galpin. 1879. Pp. 24–25. 1877–78 Saunders

With the first sight of Niagara I expected to be disappointed, but I was much more disappointed than I expected. I remained for three days, during which time it seemed to get bigger, and when the earth trembled with the force of the falling water the whole effect was impressive; but beautiful or pleasing it is not. A waterfall may be spoiled by having too much water, just as an illumination is destroyed by too much light. It is only when the overflow is sufficiently thin to break and scatter as it falls that falling water is beautiful. This effect is seen with the American Fall, and at the end of the Great Horseshoe Fall, where the overflow is comparatively slight; but the great bulk of the water goes over the centre of the Horseshoe in a straight determined manner which looks like business, but not like beauty. The surrounding country is as flat as a dining table, and a level district is not interesting even though nature has cut a big drain through it. The islands amongst the rapids above the falls are pretty and pleasant, and two or three days can be passed here very agreeably. After leaving the place the scene seems to grow and expand upon the memory, and certainly it is one which will never be forgotten. The water appears to be concentrating on the centre of the Horseshoe Fall, which is evidently breaking away, and the sides of the Horseshoe, which are now the most beautiful part, will be dry if this process is somewhat extended. Indeed, if it should be greatly developed the whole fall will become a mere rapid.

1879

ARGYLL, DUKE OF. First impressions of the new world. (Lit. liv. age, Jan. 3, 1880. 144:38–40.) 1879 Argyll

1879
Argyll

Taken from *Fraser's Magazine.* The description of the rapids is especially fine and frequently quoted.

The river Niagara above the falls runs in a channel very broad, and very little depressed below the general level of the country. But there is a steep declivity in the bed of the stream for a considerable distance above the precipice, and this constitutes what are called the Rapids. The consequence is that when we stand at any point near the edge of the falls, and look up the course of the stream, the foaming waters of the Rapids constitute the sky line. No indication of land is visible — nothing to express the fact that we are looking at a river. The crests of the breakers, the leaping and the rushing of the waters, are all seen against the clouds, as they are seen in the ocean when the ship from which we look is in the " trough of the sea." It is impossible to resist the effect on the imagination. It is as if the fountains of the great deep were being broken up, and as if a new deluge were coming on the world. The impression is rather increased than diminished by the perspective of the low wooded banks on either shore, running down to a vanishing point and seeming to be lost in the advancing waters. An apparently shoreless sea tumbling towards one is a very grand and a very awful sight. Forgetting there what one knows, and giving oneself to what one only sees, I do not know that there is anything in nature more majestic than the view of the Rapids above the Falls of Niagara.

1880

1880
Hardy

HARDY, MARY MCDOWELL DUFFUS, *Lady.* Between two oceans . . . Lond.: Hurst and Blackett. 1884. Pp. 37–55.

An interesting and original treatment of a much-hackneyed theme.

1880
Pidgeon

PIDGEON, DANIEL. An engineer's holiday; or, Notes of a round trip from longitude 0° to 0°. Lond. Keegan Paul, Trench & Co. 2v. 1882. 1:93–106.

Record of a visit to Niagara June 5–12, 1880. The author indulges in no enthusiastic descriptions of the Falls, but gives a rather matter-of-fact account of the days he spent there and his observations of the scenery, country, etc., with some information concerning the geological history of the Falls. In spite of his efforts to be matter-of-fact the description of the mist and spray of the Falls quoted below is exceedingly well written.

Every tourist must visit Niagara but need not re-describe at length the great Falls, about whose beauty and sublimity enough has perhaps been said. . . . There is none for the usual prettiness of a cascade about this fall, whose enormous mass constitutes its chief claim to the admiration of the world. The river splits on Goat Island, but the bulk tumbles over the Canadian, or Horse-shoe Falls, beside which the American falls look like a weir. And the eye soon selects the crown of the horse-shoe as the central point of the picture. There, a translucent curve of green water bends slowly from the horizontal to the vertical, and plunges with apparent deliberation over the precipice, to lose itself almost immediately in froth and mist, while out of the hell-broth below rise clouds of the finest spray. These children of the air give the chief beauty to Niagara, for the smooth, repeated liquid curves and restless foam soon pall on the eye. The mist on the other hand, changes from beauty to beauty with every alteration of atmospheric conditions. Sometimes it sways hither and thither, like gauze in the shifting winds; at others it rises in unbroken columns whose capitals float away in billowy cumuli to join their shining companions in the blue. When the air is moist and the wind blowing gently from the falls, the valley becomes filled with luminous fog. On rarely bright still days, a shaft of vapour rises to more than a thousand feet in height, forming a stationary pillar of cloud, white as snow above where it is lost by absorption, and iridescent below where its base is wreathed in rainbows. . . .

1880 Pidgeon

The strata on either side of the gorge, being nearly horizontal and formerly continuous, early suggested the idea that the falls once poured over Queenstown Heights, and have cut their way back to their present position. The existing lip of the cataract is a bed of hard limestone about eighty feet thick, supported by a similar thickness of friable shale. The falling water gives rise to extremely violent blasts of wind in the space between itself and the rock, which is consequently lashed with a perpetual storm of heavy spray. As the soft shales gradually yield before this

1880 Pidgeon

attack, the limestone capping becomes undermined and drops from time to time, causing the falls to recede. The process is of course extremely slow, but there is some evidence of a slight change of position within half a century, while a description of Niagara written in 1678 by the Franciscan missionary Père Hennequin, leaves no doubt that considerable alterations have taken place during the last hundred and fifty years. . . .

It would be extremely interesting if a regular rate of recession could be established, for this would enable the geologist to measure the minimum lapse of time which separates us from the glacial period, after whose occurrence the gorge in question was commenced. But the strata already cut through are of very various degrees of hardness, while in consequence of a slight inclination in the bedding, the hard rock forming the present lip will be at the bottom of the Falls when they have progressed two miles further southward. Wind and spray will make little impression on this compact limestone compared with what they now effect in the soft shales, and the cataract will probably remain almost stationary for ages, as has doubtless already been the case more than once in the past. Hence no reliable estimate can possibly be made of the lapse of time required for the digging of the trench. All that can certainly be known is that enormous periods have passed since the Niagara began to drain the upper lakes, yet the mollusca living in its waters to-day have undergone no change during all that time, as the shells found in the old river-bed testify. If then, living forms have remained unmodified at least as long as, and it may be much longer than, the time occupied in cutting the gorge in question, what must be the chronology of the whole geological succession to which the age of the phenomena in question bears an absolutely inappreciable proportion?

. . . . .

The surface of the plateau about Niagara is thinly covered with glacial drift, stripped of which the limestone is seen to be scored all over by ice. The marks are beautifully preserved

and all point to the north. Travelled blocks of various primitive rocks, some of them many tons in weight, lie scattered in all directions. These are evidently derived from the gneisses of the watershed north of the great lakes and the St. Lawrence, and but for the forests which clothe the country about Niagara the whole district might seem to have just emerged from the ice-sheet of the glacial period. 1880 Pidgeon

WHITMAN, WALT. Seeing Niagara to advantage. (*In his* Complete prose works. Phila.: David McKay. 1897. Pp. 160–161.) 1880 Whitman

Taken from Whitman's journal "Specimen Days" under date of June 4, 1880.

For really seizing a great picture or book, or piece of music, or architecture, or grand scenery — or perhaps for the first time even the common sunshine, or landscape, or maybe even the mystery of identity, most curious mystery of all — there comes some lucky five minutes of a man's life, set amid a fortuitous concurrence of circumstances, and bringing in a brief flash the culmination of years of reading and travel and thought. The present case about two o'clock this afternoon gave me Niagara, its superb severity of action and color and majestic grouping, in one short, indescribable show. We were very slowly crossing the Suspension bridge — not a full stop anywhere, but next to it — the day clear, sunny, still — and I out on the platform. The falls were in plain view about a mile off, but very distinct, and no roar — hardly a murmur. The river tumbling green and white, far below me; the dark high banks, the plentiful umbrage, many bronze cedars, in shadow; and tempering and arching all the immense materiality, a clear sky overhead, with a few white clouds, limpid, spiritual, silent. Brief, and as quiet as brief, that picture — a remembrance always afterwards.

1881

HARDY, MARY MCDOWELL DUFFUS, *Lady*. Through cities and prairie lands. Sketches of an American tour. N. Y.: R. Worthington. 1881. Pp. 56–58. 1881 Hardy

1881
Hardy

I quote from my companion's note-book on the spot.

"There was a break in the wood, a flash of white, a cloud of spray tossed high above the tree-tops; then the dark woods closed again. That glimpse, flashing upon us and passing before we could fully realize that the great tumbling mass was indeed Niagara, can hardly be called our first view of it. . . . It was dark when we reached the Clifton house; the roar of the falls filled our ears, we stepped out upon the balcony, and there was a sight we can never forget. It was a moonless night, and in the dusk we could only obscurely trace the vast vague outline of the two falls, divided by the blurred mass of shapeless shadows which we learned was Goat Island. As we looked upon them silently, and listened to the ceaseless boom like distant thunder, which shook the ground beneath our feet, across the snowy veil of the American Fall, to our left, shot rays of rosy light, which melted into amber, then into emerald. They were illuminating the great waters with coloured calcium lights! In whose benighted mind rose the first thought of dressing Niagara up like a transformation scene in a pantomime? It was like putting a tinsel crown and tarlatan skirts on the Venus of Milo. But these brilliant rays which fell across the American Falls, and which were turned on and off like a dissolving view, did not reach to the Horseshoe Fall away to our right. Vast, solemn, shadowy, we could just distinguish its form in the darkness, could hear the deep murmur of its awful voice. And there, between it and us, what was *that* we saw? Was it some huge pale ghost standing sentinel before Niagara? White, spectral, motionless, it rose up and reached towards the stars — shapeless, dim, vague as a veiled ghost. There was something almost supernatural about it, it was like a colossal spectre, wrapped in a robe of strange dim light.

"'How fine and upright the column of spray is tonight,' said a strange voice beside us. This broke the illusion. But yet it seemed impossible that our ghost should be only a pillar of rising

and falling spray! We saw it again, daily and nightly, but seldom again like that. We saw it blown along in clouds; we saw it like a great veil hiding the whole face of the Fall; we saw it one evening at sunset leaping and sparkling like a fountain of liquid gold,— but only once again did we see it rise up in that shape, the dim and ghostly guardian of the night. No mortal eye has ever beheld the base of the great Horseshoe Falls; it is for ever veiled and lost in a wild white chaos of foam, tossed up in the fury of its headlong plunge, and hiding its depths in mystery. 1881 Hardy

"The Indians hold that Niagara claims its yearly meed of victims. It may be so. Or does Niagara thus avenge itself on the civilization that has trimmed and tamed its forests and dressed it up in tinsel-coloured lights? But the thunder of waters thunders on eternally, and before its terrible sublimity we are dumb, as in the mighty diapason our feeble voices are lost."

1882

CAMPUZANO, D. JUAN BUSTAMENTE Y. Del Atlantico al Pacifico: Apuntes e Impresiones de un Viaje a traves de los Estados Unidos. Madrid. 1885. Pp. 346–364. 1882 Campuzano

The author's visit was made in August, 1882. He describes the cataracts, the rapids and the whirlpool, and gives the story of Francis Abbott.

1883

FAITHFULL, EMILY. Three visits to America. N. Y.: Fowler and Wells. (1884.) Pp. 395–396. 1883 Faithfull

The account deals with a new cantilever bridge and the food at Rosti's rather than with the Falls.

Holley's Niagara and the other cataracts of the world. (Cent. Jan. 1883. 3:472.) 1883

An editorial review quoted below.

"The author of this strikingly bound and profusely illustrated work is known as the writer of a guide-book to Niagara Falls, which indeed furnished the basis of the more elaborate volume. In an article contributed several years ago to this magazine, he showed his familiarity with every

1883 phase of the subject, and his ability to write entertainingly upon it. Mr. Holley speaks with the full information and enthusiasm of an old resident. It has been his purpose, evidently, to cover the whole ground of the early history, geology, and local features and incidents of the Niagara region, in a manner which will leave little to be done by any historian that may come after him. While the supplementary chapters on the other famous cataracts of the world are a small portion of the work, and make no pretension to originality, they serve the purpose of a comparison between the greatest known cataract and its numerous smaller rivals. Mr. Holley's volume is worthy of a place in every 'working library,' and visitors to Niagara Falls will find it the best of guides and souvenirs, thanks to its map, illustrations, and full descriptions of the local features and of the many tragic accidents that have happened there."

1884

1884 Hatton HATTON, JOSEPH. Henry Irving's impressions of America; narrated in a series of sketches, chronicles, and conversations. Bost.: Osgood. 1884. Pp. 366–381.

A faithful account of the impressions of Hatton, Irving, and Miss Terry, together with a description of an impromptu dinner at the Prospect House and an appreciation of the winter scenery at the Falls.

1885

1885 Lambert de Saint-Croit LAMBERT DE SAINT-CROIT, ALEXANDRE. De Paris á San Francisco. . . . Paris: Levy. 1885. Pp. 70–86.

A description of scenery at the Falls and along the river.

1885 Bianchi BIANCHI, ALBERTO G. Los Estados Unidos. Descripciones de Viaje. Editor, N. Lugo Vina. Mexico. 1887. Pp. 146–158.

An account of a visit by representatives of the Mexican Press Association.

1886

1886 Jackson JACKSON, MOSES. To America and back: a holiday run. Lond.: McCorquodale. 1886. Pp. 121–134.

An account, in holiday style, of the country and the Falls.

1887

1887 Caine CAINE, W. S. A trip round the world in 1887–1888. Lond.: Routledge. 1888. Pp. 27–32.

The record of "three delightful days" at the Falls in August, 1887. It was the author's third visit and he was able to say: "Each visit deepens the impression that so far as I have seen Nature, Niagara is the sublimest and most beautiful sight on earth." 1887 Caine

WALLACE, ALFRED RUSSEL. My life; a record of events and opinions. Lond.: Chapman and Hall. 1905. 2:127–128. 1887 Wallace

On my way back to Washington I spent four days at Niagara, living at the old hotel on the Canadian side, in a room that looked out on the great fall, and where its continuous musical roar soothed me to sleep. It was a hard frost, and the American falls had great ice-mounds below them, and ranges of gigantic icicles near the margins. At night the sound was like that of a strong, steady wind at sea, but even more like the roar of the London streets heard from the middle of Hyde Park. When in bed a constant vibration was felt. I spent my whole time wandering about the falls, above and below, on the Canadian and the American sides, roaming over Goat Island and the Three Sisters Islands far in the rapids above the Horse-shoe Fall, which are almost as impressive as the fall itself. The small Luna Island dividing the American falls was a lovely sight; the arbor-vitae trees (*Thuya Americana*), with which it is covered, young and old, some torn and jagged, but all to the smallest twigs coated with glistening ice from the frozen spray, looked like groves of gigantic tree corals — the most magnificent and fairy-like scene I have ever beheld. All the islands are rocky and picturesque, the trees draped with wild vines and Virginia creepers, and afford a sample of the original American forest vegetation of very great interest. During these four days I was almost entirely alone, and was glad to be so. I was never tired of the ever-changing aspects of this grand illustration of natural forces engaged in modelling the earth's surface. Usually the centre of the great falls, where the depth and force of the water are greatest, is hidden by the great column of spray which rises to the height of four hundred or five hundred feet; but occasionally the wind

1887 Wallace drifts it aside, and allows the great central gulf of falling water to be seen nearly from top to bottom — a most impressive sight.

1888

1888 Gray GRAY, DAVID. Letters, poems and selected prose writings. Buf.: Courier Co. 1888. Pp. 347–351.

A sympathetic description of the Falls on a February midnight. He compares them to a battle around icy fortifications.

1888 Niagara Falls sketch book. Buffalo: Sumner. 1888.

1888 Pond POND, CHESTER E. The Falls of Niagara. Our school of sublimity . . . Topeka, Kan.: 1888.

The description of the various points of interest is divided into nine lessons. The author feels that many days should be spent at the Falls and along the river "in a thoughtful and childlike state of receptivity."

1889

1889 Ballou BALLOU, MATURIN M. Footprints of travels; or, Journeyings in many lands. Bost.: Ginn. 1889. P. 2.

1889 Arnold ARNOLD, *Sir* EDWIN. Seas and lands. N. Y.: Longmans, Green. 1891. Pp. 41–44.

A poetical description of a visit made in September, 1889.

Before the balcony in which this is written the Great Cataract of America is thundering, smoking, glittering with green and white rollers and rapids, hurling the waters of a whole continent in splendour and speed over the sharp ledges of the long brown rock by which Erie "the Broad" steps proudly down to Ontario "the Beautiful." Close at hand on our left — not indeed farther removed than some 600 or 700 yards — the smaller but very imposing American Fall speaks with the louder voice of the two, because its coiling spirals of twisted and furious flood crash in full impulse of descent upon the talus of massive boulders heaped up at its foot. The resounding impact of water on rock, the clouds of water-smoke which rise high in air while the river below is churned into a whirling cream of eddy and surge and

backwater, unite in a composite effect, at once magnificent and bewildering. But if you listen attentively you will always hear the profound diapason of the great Fall — that surnamed the horseshoe — sounding superbly amid the loudest clamour and tumult of its sister, a deeper and grander note; and whenever for a time the gaze rests with inexhaustible wonder upon that fierce and tumultuary American Fall, this mightier and still more marvellous Horseshoe steals it away again with irresistible fascination. 1889 Arnold

Full in front lies that wholly indescribable spectacle at this instant. Its solemn voice — an octave lower than the excited, leaping, almost angry cry of fervid life from the lesser cataract — resounds through the golden summer morning air like the distant roar from the streets of fifty Londons all in full activity. Far away, between the dark grey trees of Goat Island and the fir-woods of the Canadian shore, the Niagara River is seen winding eagerly to its prodigious leap. You can discern, even from this balcony, the line of the first breakers, where the Niagara River feels, across its whole breadth, the fateful draw of the Cataracts, where its current seems suddenly to leap forward, stimulated by a mad desire, a hidden spell, a dreadful and irresistible doom. You can note far back along the glided surface of the upper stream how these lines of dancing, tossing, eager, anxious, and fate-impelled breakers and billows multiply their white ranks and spread and close together their leaping ridges into a wild chaos of racing waves as the brink is approached. And then, at the brink there is a curious pause — the momentary peace of the Irrevocable. Those mad upper waters — reaching the great leap — are suddenly become all quiet, and glassy, and rounded, and green as the border of a field of rye, while they turn the angle of the dreadful ledge and hurl themselves into the snow-white gulf of noise, and mist, and mystery underneath.

There is nothing more translucently green, nor more perennially still and lovely, than the actual hanging brow of Niagara the

1889
Arnold

Greater. At her awful brink the whole architrave of the main abyss gleams like a fixed and glorious work wrought in polished aquamarine or emerald. This exquisitely coloured cornice of the enormous waterfall — this brim of bright tranquillity between fervor of rush and fury of plunge — is its principal feature, and stamps it as far more beautiful than terrible. Indeed the whole spectacle of the famous cataracts is one of delight and of deepest charm, not by any means of horror or of awe; since nowhere are the measureless forces of Nature more tenderly revealed, more softly and splendidly clad, more demurely constrained and docile between its steep confines. Even the heart of the abyss, in the recess of the Horseshoe, where the waters of Erie and Superior clash together in tremendous conflict — the inner madness and miracle of which no eye can see or ever will see, by reason of the veils of milky spray and of the rolling clouds of water-drift which for ever hide it — even this central solemnity and shudder-fraught miracle of the monstrous uproar and glory is rendered exquisite, reposeful, and soothing by the lovely rainbows hanging over the turmoil and clamour. From its crest of chrysophrase and silver, indeed, to its broad foot of milky foam and of white stunned waves, too broken and too dazed to begin at first to float away, Niagara appears not terrible, but divinely and deliciously graceful, glad, and lovely — a specimen of the splendour and wonder of water at its finest — a sight to dwell and linger in the mind with ineffaceable images of happy and grateful thought. by no means to affect it either in act of seeing, or to haunt it in future days of memory, with any wild reminiscence of terror or of gloom.

1889
Withrow

WITHROW, WILLIAM H. Our own country. Canada scenic and descriptive. . . . Toronto. Wm. Briggs. 1889. Pp. 317–341.

The author comments on the exhaustless supply of the Falls and their appearance in winter. He describes the trip under the Falls and the Cave of the Winds, and in his description quotes from Trollope and Dr. Dewart's poem on the Falls. One description for which he gives the

credit to Ruskin, by comparison with the famous Dickens description will be found to be identical with it. For the sake of this comparison the description is quoted below. 1889 Withrow

. . . Watch how the vault of water first bends unbroken in pure polished velocity over the arching rocks at the brow of the cataract, covering them with a dome of crystal twenty feet thick — so swift that its motion is unseen, except when a foam globe from above darts over it like a falling star; and how ever and anon, a jet of spray leaps hissing out of the fall like a rocket, bursting in the wind, and driven away in dust, filling the air with light; whilst the shuddering iris stoops in tremendous stillness over all, fading and flushing alternately through the choking spray and shattering sunshine.

Still do these waters roll and leap and roar and tumble all day long: still are rainbows spanning them a hundred feet below. Still, when the sun is on them, do they shine and glow like molten gold. Still, when the day is gloomy, do they fall like snow, or seem to crumble away like the front of a great chalk cliff, or roll down the rock like dense white smoke. But (326) always does the mighty stream appear to die as it comes down, and always from the unfathomable grave arises that tremendous ghost of spray and mist which is never laid, which has haunted this place with the same dread solemnity since darkness brooded on the deep, and that first flood before the deluge — Light — came rushing on creation at the word of God.

Stable in its perpetual instability, changeless in its everlasting change; a thing to be "pondered in the heart" like the revelation to the meek Virgin of old: with no pride in the brilliant hues that are woven in its eternal loom: with no haste in the majestic roll of its waters: with no weariness in its endless psalm — it remains through the eventful years an embodiment of unconscious power, a living inspiration of thought, and poetry and worship — a magnificent apolcalypse of God.

1890

1890 Fraser

FRASER, JOHN. Canadian pen and ink sketches. Montreal: Gazette Printing Co. 1890. Pp. 155–156.

"Did you ever do the Falls?" asked an American tourist the other day of the writer. "No," we replied, "but the Falls once *did us* in a way that cleaned out our then little purse." We, however, at that time, in our young days, had the pleasure of enjoying a most delightful visit or sojourn — not as a guest — of two weeks at the Falls of Niagara. That visit, and how it was accomplished, is now as fresh in our memory as if it were yesterday; of which the following is a true and faithful account:—

This was over forty years ago. It was spring time, in the month of April, 1845. We were then at Toronto, better known a few years earlier as "Muddy Little York." We had what we supposed a well-filled purse of English shillings and half-crowns, amounting, all told, to fifteen dollars and fifty cents; cash was then scarce in the West. All was "store pay." Fifty to seventy-five pounds a year was then a fair salary for a young clerk, very little of which was paid him in cash. His board cost him ten dollars a month, paid in store pay. Then his clothing was charged to his account in the store; so that a young clerk in those days in the West, after his board and clothing were paid, had not much over five to six dollars a month left him for pocket money; therefore, we considered ourselves as passing rich in having fifteen dollars and fifty cents in our purse.

We had given up our old situation, and had made a new engagement, to be entered upon on the first of May following; and having a little over two weeks' spare time, and, as we thought, a well-filled purse, the question was, where to go and how to spend it to the best advantage in sight-seeing. Fortunately, we found a companion, a genuine Hibernian, well-informed, about our own age, having a little spare time, too, and equally rich, our two united purses amounting to a little

over thirty dollars; so we joined hands, and a visit to the Falls of Niagara was decided on. 1890 Fraser

The vulgar term of "doing the Falls" was not known in our young days. Our baggage was not heavy; besides the clothes we wore, a small carpet bag, containing a change of linen, socks, etc., a Mackintosh and a walking stick, comprised our whole baggage. Travelling was cheap in those early days.

It was on a Saturday morning, in the month of April, 1845, that we walked on board the steamer at Toronto, to cross Lake Ontario to Queenston, from which place there was a Horse Car to Drummondville, within a mile of the Falls. The trip from Toronto to Drummondville cost us three dollars.

We entered the Head Inn in the village, an unpretending place, and arranged for two weeks' board and lodging at half a dollar a day each. This amounted to fourteen dollars for both of us for the two weeks, by which our purse was lightened one-half. We had comfortable quarters; there were no visitors but ourselves at that time at the Falls. Our host was ignorant of our wealth or standing. We kept that secret to ourselves, maintaining a dignified reserve; no doubt putting on a few little airs, as most travellers do. No personal in the local papers announced our arrival, but our appearance being respectable commanded the respect of the villagers. We had the place all to ourselves.

The next morning, Sunday, an April morning, we strolled down after breakfast to have our first view of the Falls of Niagara. The constant and continuous roar — or rather thunders, from the tumbling rapids, rang in our ears the whole of the previous night. It was music grand and wild. It chimed in, and was in accord with our youthful tastes. It was a charming morning, with blossom and bloom overhead; there was silence all around, the silence of a Sabbath morning in a quiet country side. Nothing was heard save the song of birds, the early spring notes of those little choristers of the woods; and the thunders

1890
Fraser

of Niagara ascending high and far above, made us feel somehow as if we had been transported to fairyland.

We cannot, even at this lapse of time, find words to express fittingly our feelings — the feelings which crept over us as we approached the mighty cataract; where the waters of Lake Erie and the other Upper Lakes find their outlet into Lake Ontario over a space less than half a mile in width.

Our thoughts, our feelings, expressed in deepest silence, rose upwards, as it were, from

"NATURE UP TO NATURE'S GOD."

Such were our thoughts, our feelings, as we strolled down from the village of Drummondville on that April Sunday morning, over forty years ago, with the song of birds and the thunders of the cataract sounding in our ears, and blossom and bloom overhead, to have our first full view of the Falls of Niagara.

"Proud demon of the waters!" we exclaimed. "Thou, around whose dark and stormy brow circles the rainbow's varied gem!" There we stood for the first time, gazing in wonder and in silent admiration on that mighty mass of water as it rolled in majestic splendour over its rock-bound summit, in an almost unbroken wave into the yawning whirlpool below!

"Come," we said, "expressive silence, muse its praise."

There have been many accounts descriptive of the Falls of Niagara and the surrounding country, but the best is that contained in the journal of Captain Enys, of the 29th Regiment, written over one hundred years ago, in 1787. It gives a true account, from Fort Sclosser, on the American side, two miles above the Falls, down to the foot of the Falls, and for four miles down on the Canadian shore. The whole river bank, on both sides of the Niagara, was then an unbroken forest. Captain Enys' journal was obtained from his son in New Zealand, and is now deposited in the Canadian Archives, Ottawa. [See Douglas Brymner's Report for 1886, page ccxxvi.]

There were no guide-books in those early days to instruct the visitor 1890 Fraser

HOW TO DO THE FALLS,

as it is vulgarly termed. We were entirely guided by our former limited reading, and by our open eyes; and we did them —the Falls — to our entire satisfaction, and, perhaps, better than the thousands who annually visit them. We often smile when we hear people ask: Which is the best season to visit the Falls? We have often heard the expression of disappointment:— "That few people were there — nobody of note." What did they go for? Was it to see and to meet with

CONGREGATED SHODDY

or was it to view one of the grandest sights to be seen on this continent?

The Falls of Niagara are the same at all seasons — springtime, summer or winter. We have since visited them at all seasons, and were we asked the best time to do so, we would, without hesitation, say winter. We, at one time, visited them during the month of March, when the whole mass of ice from Lake Erie came rushing over the Falls in such quantities, that the river from the town of Niagara upwards got jammed, forming a bridge of ice for miles. Few visitors have seen this grand sight. At another time we saw, on an early spring morning, the whole of the surrounding trees covered with icicles, caused by the spray from the Falls, hanging and swinging from the branches, and glistening and disappearing under the rays of the sun, affording a sight which no pen can describe nor pencil paint.

The whole neighbourhood has many attractions besides the Falls. It was springtime on our first visit. The surrounding country is famed for its old Canadian homesteads and its fruit orchards and flower gardens, being the earliest settled parts of Western Canada by the U. E. Loyalists. The whole country was then in bloom. The apple, the pear, and the peach orchards, with plum gardens in the old Niagara district, the then garden

1890 Fraser

of Canada, were then in full blossom. Couple this grand sight with that of the Falls, and the reader of this day will say that we, two young Canadian tourists, were more fortunate in our time of "doing the Falls" than most visitors.

A chapter on "The Falls of Niagara Over Forty Years Ago," giving a humorous account of a visit made in April, 1845.

1890 Parrott

(PARROTT, CARYL S.) A descriptive reading on Niagara Falls. . . . Phila.: W. H. Rau. 1890.

The author considers it hopeless to describe the Falls. "The essential quality of Niagara is its sublimity." There are other falls of greater height, "but none of them approach this cataract in that first essential of magnificence."

1892

1892 Smith

SMITH, WILLIAM. A Yorkshireman's trip to the United States and Canada. Lond.: Longmans, Green. 1892. Pp. 230–247.

A well-written and well-balanced account of a leisurely trip around the Falls.

1893

1893 Buckingham and Chandos

BUCKINGHAM AND CHANDOS, *Duchess* OF A. A. Glimpses of four continents, letter written in 1893. Lond.: Murray. 1894. Pp. 273–275.

A brief and casual record of a visit made in May, 1893, with no attempt at description.

1894

1894 Johnstone

JOHNSTONE, C. L. Winter and summer excursions in Canada. Lond.: Digby, Long and Co. 1894. Pp. 206–207.

1895

1895 Hole

HOLE, SAMUEL REYNOLDS. A little tour in America. Lond. and N. Y.: E. Arnold. 1895. Pp. 171–185.

Considers Niagara "the most wonderful place in the world."

1895 Raun

RAUN, GEORGE E. A tour around the world. N. Y.: Gottsberger. 1895. Pp. 412–413.

1896

1896

Greater Niagara. Niagara Falls; Mrs. S. D. Morse. 1896.

A description of the Falls, the parks on both sides of the river, the scenic attractions, and the improvements which have been made.

1897

D. W. The glory of Niagara. (Life and health, Aug. 1897. Pp. 264–266.) 1897 D. W.

The writer urges the need of time for due comprehension of the wonders and beauties of Niagara. He also tells of the improvements at the hotels and elsewhere about the Falls since prereservation days.

1899

VAN RENSSELAER, *Mrs.* SCHUYLER. Niagara. (Cent., June, 1899. 36:184–202.) 1899 Van Rensselaer

Mrs. Van Rensselaer gives a very detailed description of the Falls at different seasons of the year. The sound of the Falls is described as musical rather than terrifying, as so many visitors have found it. The author feels that "Niagara's true effect is one of permanence."

And the best season for Niagara? Each has its own claim. Winter sometimes gives the place an arctic picturesqueness, a dazzling semi-immobility, utterly unlike its affluent, multicolored summer aspect; but one could hardly wish to see it only in winter, or in winter first of all. It is most gorgeously multicolored, of course, when its ravine and its islands commemorate its long-dead Indians by donning the war-paint of autumn. And it is most seductively fair in early spring. Then, at the beginning of May, when the shrubs are leafing and the trees are growing hazy, its islands are the isles of paradise. This is the time of the first wild flowers. Spread beneath the forest that still admits the sun-floods through its canopies, massed in the more open glades, and wreathed along the edges of pathways and shores, they fill Goat Island full, whitely bank and carpet it — snowy trilliums in myriads, bloodroots, dicentras, smilacinas, and spring-beauties, varied by rose-tinted spring-cresses and yellow uvularias, and underlaid by drifts of violets. Hardly anywhere else over so large an area can these children of May grow in such profusion, for even when the sun shines hottest upon them the air is always delicately dampened by the spraying floods. Here nature so faithfully fosters them that they need (186) not be jealously

1899 Van Rensselaer

guarded by man. Whoever will may gather them by the armful.

It is good to see Niagara at this time. But it is still better to see it when its trees and shrubs and vines are in fullest leaf and many of them in blossom. Then their value is greatest as a setting for the endless series of large and small, near and distant water pictures; and then the temperature incites to lingering. The very best time of all is in June.

. . . . .

"It was worth while to come to Niagara," I heard some one exclaim, in June, "just for the sake of its odors." They are indeed many and pervasive, yet one of them dominates the rest. Centuries ago Pliny wrote that the vineyards of Italy gave it sovereignty over all other lands, "even those that bring forth odoriferous spices and aromatical drugs;" and he added, "to say a truth, there is no smell whatsoever that outgoeth vines when they be in their fresh and flowering time." He would surely have written the same words had he stood on Niagara's islands in one of his far-back Junes. Everywhere are wild grape-vines, draped in thick curtains or swung in wide loops, and they bloom a long time, for one species begins to open its flowers as another is setting its fruit. For many days this most dainty, individual, and bewitching of all odors meets us on every soft puff of wind, with such persistence that wherever it may meet us again in future years it will seem like a message from Niagara.

And the noise of Niagara? Alarming things have been said about it, but they are not true. It is a great and mighty noise, but it is not, as Hennepin thought, an "outrageous noise." It is not a roar. It does not drown the voice or stun the ear. Even at the actual foot of the falls it is not oppressive. It is much less rough than the sound of heavy surf — steadier, more homogeneous, less metallic, very deep and strong, yet mellow and soft; soft, I mean, in its quality. As to the noise of the rapids, there is none

more musical. It is neither rumbling nor sharp. It is clear, plangent, silvery. It is so like the voice of a steep brook — much magnified, but not made coarser or more harsh — that, after we have known it, each liquid call from a forest hillside will seem, like the odor of grape-vines, a greeting from Niagara. It is an inspiriting, an exhilarating sound, like freshness, coolness, vitality itself made audible. And yet it is a lulling sound. When we have looked out upon the American rapids for many days, it is hard to remember contented life amid motionless surroundings; and so, when we have slept beside them for many nights, it is hard to think of happy sleep in an empty silence. 1899 Van Rensselae

Still another kind of music is audible at Niagara. It must be listened for on quiet nights, but then it will be heard. It is like the voice of an orchestra so very far away that its notes are attenuated to an incredible delicacy and are intermittently perceived, as though wafted upon variable zephyrs. It is the most subtile, the most mysterious music in the world. What is its origin? Why should we ask? Such fairy-like sounds ought not to be explained. Their appeal is to the imagination only. They are so faint, so far away, that they almost escape the ear, as the lunar bow and the fluted tints of the American Fall almost escape the eye. And yet we need not fear to lose them, for they are as real as the deep bass of the cataracts.

1901

Annotated time table of the tour through Canada of their Royal Highnesses the Duke and Duchess of Cornwall and York. . . . October, 1901. 1901

WALDRON, HOLMAN D. Niagara Falls in half-tone. Text by Holman D. Waldron. . . . Portland, Me. Chisholm. 1901. 1901 Waldron

Fine views and description of the Falls.

1905

HURET, JULES. En Amerique: de San Francisco au Canada. Paris: Charpentier. 1905. Pp. 329–337. 1905 Huret

1908

1908 Giacosa — GIACOSA, GIUSEPPE. Impressioni d' America. Milano: Cogliati. 1908. Pp. 130–157.

A chapter with much of American railroad travel and of the journey from New York and something of the author's impressions of Niagara Falls.

1911

1911 — The spectator. (Outl., May 27, 1911. 98:147–152.)

The adventures of a young woman who tried to see the Falls alone but was unable to escape acquaintances made on the journey. The account contains more about people than about the Falls.

1913

1913 Alec-Tweedie — ALEC–TWEEDIE, *Mrs.* E. America as I saw it; or America revisited. N. Y.: Macmillan. 1913. Pp. 347–356.

NIAGARA UP-TO-DATE

God's Work, Man's Slave.
Even Niagara is up-to-date

The Philistine is doing his best to ruin one of God's greatest works, but luckily he cannot succeed.

He has written his name in letters of shame on seats in the public parks on each side of Niagara's stupendous Falls; he has scrawled his hideous hieroglyphics on rocks at every point of view; he has even put up advertisements hard by, exploiting pills and powders and soaps and shams; he has erected large chimneys and hideous factories below the Falls; but, in spite of all, he cannot spoil Niagara. He has tried hard, this up-to-date advertiser, but he has failed as yet to ruin one of Nature's triumphs.

We crossed by boat from Toronto on the Canadian side to Lewiston. It is only two and a half hours' steam over the narrowest part of Lake Ontario; nevertheless quite a number of people managed to be uncomfortably ill, and certainly we did pitch a little, in spite of the barrels of sand kept for the purpose that were rolled from side to side by boys to steady our ship. The

United States Custom-house officer was on board, and "Oh, my!" as our Canadian friends exclaimed, "he did just rout!" He searched rigorously; even small hand-bags were denuded of every bottle and packet for inspection, so particular are the authorities in these matters. 1913 Alec-Tweedie

Leaving the lake at "Niagara on the Lake," we had a pleasant seven miles' run up the river to Lewiston, where the electric tram awaited us. This calm, pretty, reposeful Niagara River is the outlet of several enormous lakes which divide parts of America from Canada. Though near the foot of the great Falls, it looked so quiet and peaceful that we experienced much difficulty in realising that those thousands of miles of lakes, and those great cataracts, could be emptying themselves through this comparatively small river into the sea.

It was early in October; the hotels were shutting up for the winter, the boats making their last passages, and yet the hundreds and hundreds of wooden baskets, full of peaches, grapes, greengages, apples, and pears, which carpeted the wharf, all grown near Niagara, hardly suggested winter, but rather warm summer weather, which indeed it was, for the thermometer stood at 78° in the shade.

It is a wonderful tram-car journey, that gorge line — some seven miles long — from Lewiston to Niagara Falls, built so close to the edge that often the rails are barely two feet from the side of a cliff dropping sheer down some twenty to forty feet, with a cataract or whirlpool swirling away below. On our left the cliff rose perpendicularly some two hundred or three hundred feet.

As we neared the village of Niagara Falls the road became more and more beautiful; and a huge rock here, a cave there, added grandeur to the scene.

At the whirlpool we drew up for a moment; it seemed almost like a small lake, so completely was it shut in, but the waters were comparatively calm as they swirled round and round in endless rotation. Here was the very representation of the

1913 Alec-Tweedie

proverb, "Still waters run deep;" many hundreds of feet deep is this whirlpool, yet a barrel will continue turning round and round for days upon its surface.

. . . . .

The Whirlpool rapids are wonderful, and far more turbulent than the whirlpool itself. They are naturally at the narrowest part of the river, which is there spanned by two splendid railway bridges. In the course of one mile the rapids make a drop of over a hundred feet as the waves froth and foam and swirl over one another.

Strangely enough, not only does the water look like the waves of the ocean beating upon the land in a storm, but there is almost a sea smell in the air, although the water is really fresh. A green, seaweedlike growth covers the rocks, and perhaps the smell may proceed from that; in any case, it is distinctly noticeable.

The clock struck six as we left the hotel at "Niagara" on the American side, and wandered forth for our first peep at the Falls before dinner. We passed through Prospect Park, heard the swirl of the upper rapids, realised that evening was drawing in with the strange rapidity it does in these climes; and then all in a moment we seemed to stand on the very brink of the American Fall itself.

This was Niagara. This mystic veil shrouded the widest, noblest waterfall in the world; for though report says the Victoria Falls on the Zambezi are just as fine, it is in their height that their wonder lies.

We heard the rush, and stood still.

It was a wonderful sensation suddenly to find oneself near enough to the edge of the flow to be able to touch the water with an umbrella, as it took its dive of a hundred and fifty feet into the seething cauldron of froth and spray below.

It is absolutely impossible to give any idea of the magnitude of volume of that water, which, as we saw it, in the short twilight and quickly gathering darkness of night, seemed weird in its vastness, and eerie in its grey-blue opalescent charm. The great

General View of the Falls of Niagara

From a sketch by A. Wilson, 1810

Canadian Horseshoe Fall, by far the grander of the two, was lost in spray and evening mists. Verily, a scene of poetry and romance; and yet of strength withal, for the power of that force is stupendous. It seemed unreal, untrue, half hidden by a mist of watery crystals and covered by a veil of darkness. 1913 Alec-Tweedie

Grey clouds descended to meet the ascending foam; all seemed unfathomable, weird, and strange; a hazy moon rose rapidly in the sky and we shuddered as we thought of the horrors of a pouring wet day on the morrow, which indeed seemed imminent after such a grey, misty, autumn evening.

Next morning, however, all was changed; the watery moon had given place to gorgeous sun, the grey clouds had dispersed, and the heavens were blue, a vast expanse of cobalt blue. When we reached Prospect Point a little after breakfast, it seemed impossible that the wild, ethereal, Brocken-like effect could have been followed by such a glorious Indian-summer day. We saw more than on the previous evening; we saw everything clear and sharp and distinct; we loved the rainbows chasing each other in the spray; but the charm and the poetry had gone.

Niagara in the glare of the day was disappointing, and we longed for the evening again. We longed for the mist to hide those hideous advertisements which hit us and hurt us. But we had not time to dally, for a day and a half is little enough at Niagara; so into a wonderful electric railway shoot we went, and in a few seconds were whirled down below the cliffs, and into the little steamer known as the *Maid of the Mist*, which goes right up to the very Falls themselves.

We took off our hats and, putting on mackintosh coats and head coverings, sat boldly on deck. The spray from the Falls is more wetting that a really steady downpour of rain, for it comes not merely from above and the sides, but rises up from below; it comes from everywhere, in fact, and the drops of water simply poured down our noses. But it was worth going through such an experience, although, when we really turned round under the Horseshoe Falls on the Canadian side, the

1913 Alec-Tweedie

feeling of bobbing about in a cockle-shell on a whirlpool was rather ghastly, and we all had to hold tight to keep our seats on the deck at all, so tremendous is the force of the water across which this little craft ventures.

The spot known as Rock of Ages forms a perfect picture. The rugged brown grandeur of the stones, the white frothy spray, and the green and blue hues of the water, with the sun shining through, made a scene such as no artist's brush could ever catch in feeling, colour, or force. The sublimest works of nature can never really be reproduced by art; for, at its best, art cannot depict fleeting sentiment, ever changing beauty. Every cloud, every sunbeam, alters the scene on which it falls, as every thought changes the expression of a face. Pictures, much as we love them, can only express one phase; they cannot represent all.

It was a short trip, though an extremely interesting one; and we left our boat on the Canadian side to drive along the park and go under the Horseshoe Fall, so as to obtain an idea of the water from below.

The Canadian side is certainly the best from which to see Niagara Falls; the views are better, the park is better; nature is left more to herself; and is not disfigured by such enormous hotels with rows and rows of straight, ugly windows.

Having driven along the top of the cliff, we arranged to go below the Falls.

"Will the lady step into that room?" asked an attendant, which the lady accordingly did.

"You must take off nearly all your things and put on these mackintosh trousers, coat, and helmet," was the next mandate. We mildly remonstrated, but remonstrance was of no use; the woman assured us we should be wet to the skin unless we did as she bid us, and subsequent experiences proved that she was right.

The black trousers were large and baggy, of the peg-top order, and about as thick as a coachman's driving apron. The attendant

tied them in at the knees with white tape to keep them off the ground, for they seemed to have been made for a woman at least six feet six inches in height. Goloshes — so loved by *The Private Secretary* and by all Americans — were next adjusted from a row which contained some hundreds of pairs, reminding us of Ibsen's hall in Christiania, where we saw goloshes standing in rows one snowy winter; then the coat was fixed, and the headgear, after putting a towel round the throat, was strapped on. What a sight. What sights, indeed, we all looked! Then out into the sunshine we went, men and women seeming exactly alike, and yet each more hideous than the other. We laughed and chatted, got into the lift, and were whirled below, to walk along a small wooden pathway with occasional staircases,— all very slippery, and, to our thinking, not over substantial. It became wetter and wetter under foot and more drenching from above as we proceeded, and we soon realised the good lady was right; no ordinary clothing could have withstood a millionth part of the spray of Niagara.

1913
Alec-Tweedie

We paused almost in front of a branch of the Fall and tried to look up; but so blinding was the whirlwind of spray that we could hardly see.

The cavern was washed out by the wash of ages.

A huge sheet of water, a stupendous curtain of force, so thick that its transparent drops were massed into a translucent wall, fell beside us. It was so thick, so dense, so immense that we could barely see the beams of light through that massive veil of water.

The spray filled our eyes, hung upon our lashes, ran down our noses until we tried to gasp out that we had seen enough; and gladly turned away. The sound was deafening; we could not hear one another speak. The spray was too great to allow us to see anything, and yet this was only a small branch of the Falls themselves. It gave a wonderful idea of what the hourly, weekly, monthly, yearly overflow of those Falls, which Goat Island divides, must be.

1913
Alec-Tweedie

"Please walk this way," said our guide, and into a long, dark passage, with a tiny gleam of light at the end, we went.

So great is the force of the fall that it flows outwards many feet from the rocks themselves, and enables people actually to stand under the arch of water in comparative comfort. On looking up there seems a veritable roof of water through which the sun shines; on our right was the grey rock over which the water rushes, while on our left was a wall of water, falling into the seething pool far away below.

Niagara is worth travelling many hundreds of miles to see; its power, its strength, its force, teach a sermon far deeper and more lasting than the best of sermons, or the finest books of man. Even the most frivolous must pause and think before such a masterpiece of majestic Beauty and Power. It is devoutly to be hoped that the material gain to the industrial undertakings in the neighbourhood will not be allowed to destroy one of the greatest, most forceful, and most awe-inspiring sights of the world.

Summary

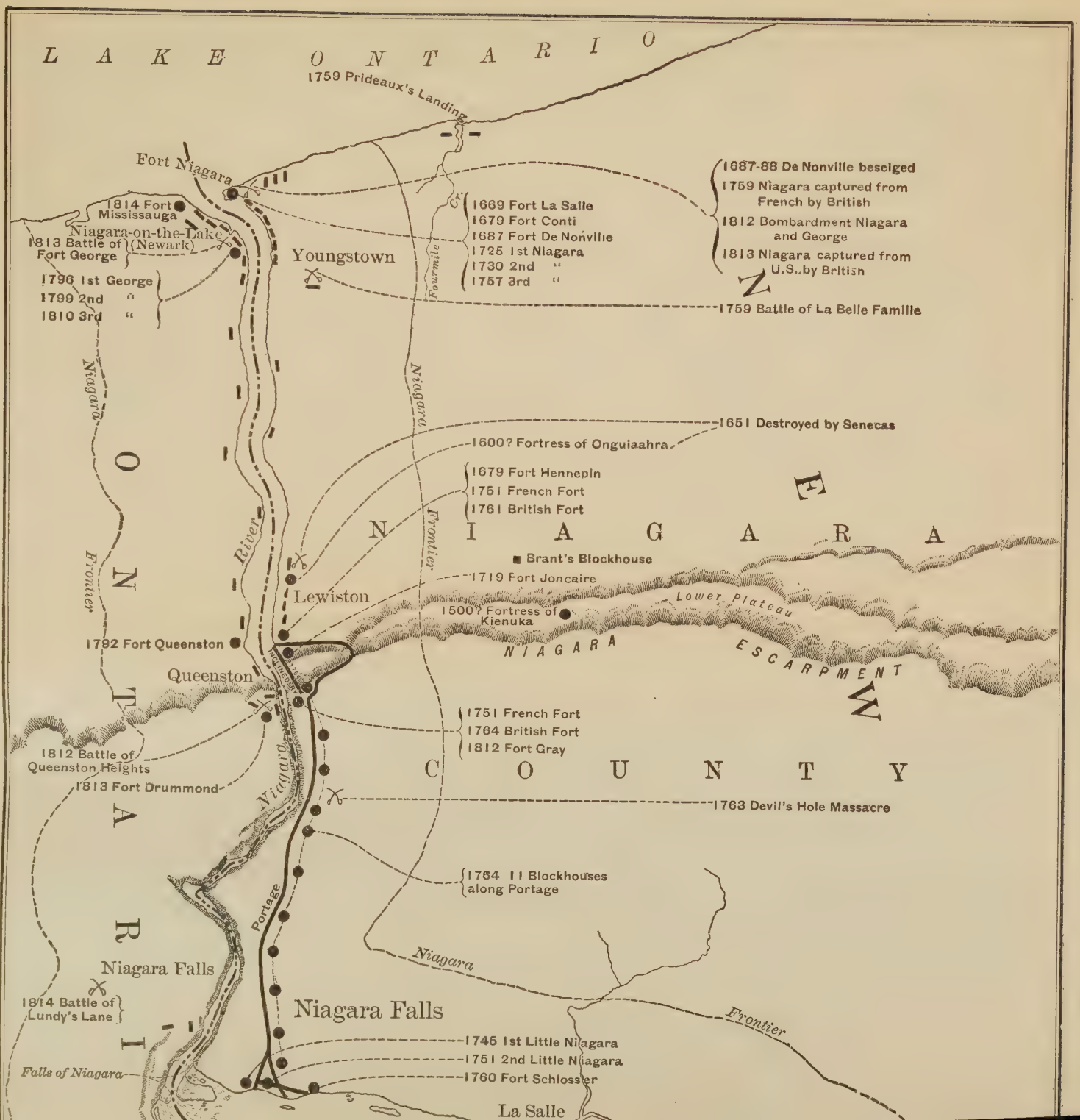
After 1840 there was a marked decrease in the annual production of Niagara description of the sort quoted thus far. The Civil War no doubt had an effect, but this temporary disturbance does not explain the continued decline in the number of old-line travelers' accounts. The fact is that though the number of books is fewer, the tide of tourist travel to Niagara is constantly increasing. Whereas in former times visitors came by hundreds and thousands, now they come by the million. Writers come also no doubt and in greater numbers than ever before, but they do not write, or at least not in the same way. A visit to Niagara in these days is no longer the event of a lifetime to be duly chronicled with a careful description of all the points of interest and accompanied by a minute analysis of the reflections and emotions which it inspires. There are many other wonders in these times. Moreover Niagara is now so well known and guide

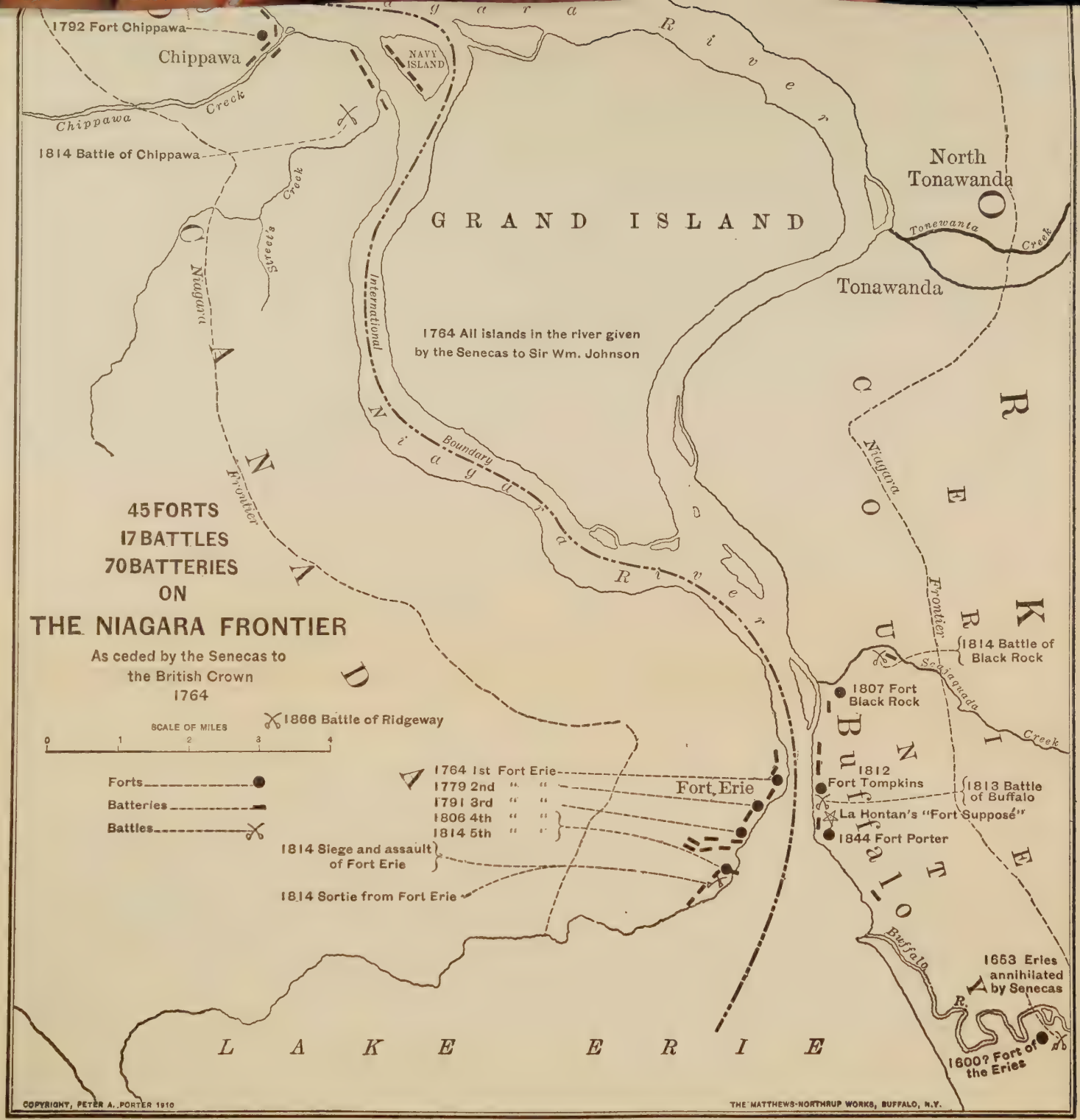
books are so numerous that descriptions for information concerning its scenic features are no longer necessary. Religious reflections and sentimental rhapsody have been well exhausted.

All this does not mean that the volume of Niagara literature as a whole is really decreasing; a glance at other chapters in this book will furnish abundant evidence that this is far from being the case. It means merely that Niagara literature of these days is of an altogether different sort from the old-time travelers' descriptions. Scientific and industrial aspects and preservation are now occupying the attention formerly concentrated on Niagara as a scenic spectacle.

It appears from this chapter that while there is relatively less writing and especially less fine writing, the bulk of the accounts and worthiest contributions are American.

Chapter V


LAKE ONTARIO
1759 Prideaux's Landing
Fort Niagara
1814 Fort Mississauga
Niagara-on-the-Lake
1813 Battle of (Newark) Fort George
1796 1st George
1799 2nd "
1810 3rd "
Youngstown
1669 Fort La Salle
1679 Fort Conti
1687 Fort De Nonville
1725 1st Niagara
1730 2nd "
1757 3rd "
1687-88 De Nonville beseiged
1759 Niagara captured from French by British
1812 Bombardment Niagara and George
1813 Niagara captured from U.S., by British
1759 Battle of La Belle Famille
Niagara River
Niagara Frontier
Niagara River
1651 Destroyed by Senecas
1600? Fortress of Onguiaahra
1679 Fort Hennepin
1751 French Fort
1761 British Fort
ONTARIO
NIAGARA
Brant's Blockhouse
1719 Fort Joncaire
Lewiston
1500? Fortress of Kienuka
Lower Plateau
1792 Fort Queenston
NIAGARA ESCARPMENT
Queenston
1751 French Fort
1764 British Fort
1812 Fort Gray
1812 Battle of Queenston Heights
1813 Fort Drummond
COUNTY
1763 Devil's Hole Massacre
Niagara
1764 11 Blockhouses along Portage
Portage
Niagara Falls
Niagara
Frontier
1814 Battle of Lundy's Lane
Niagara Falls
1745 1st Little Niagara
1751 2nd Little Niagara
1760 Fort Schlosser
Falls of Niagara
La Salle



By Courtesy of Peter A. Porter

CHAPTER V

NIAGARA — HISTORICAL AND REMINISCENT

1755

R. C. An account of the English and French colonies in North America. (Universal mag. Nov. 1755. 17:218–221.) **1755 R. C.**

This account comprises a description of the river, the carrying places, the location, geology, height, noise, and vapor of the Falls, the rainbow and a first trip to Goat Island. It sounds like an account written by a subordinate of a party.

On this carrying-place I saw about two hundred Indians, most of them belonging to the Six Nations, busy in carrying packs of furs, chiefly of deer and bears, over the Carry-place. It is surprising to see what quantities of these goods are brought every day over this carrying-place. An Indian has twenty pence for every pack he carries over; and he dearly earns it, for the distance is nearly three leagues.

. . . . .

Thus have I given a short but faithful description of this famous cataract of Niagara.

1759

BRICE, ANDREW. Universal geographical dictionary. . . . Lond.: Robinson and Johnston. 1759. P. 260. **1759 Brice**

One (fall) in particular near *Niagara*, is between 7 & 800 f. high, half a League broad, the Water of which runs so violently, that all Beasts attempting to cross it a Qr. Leag. above are swallowed up: And it tumbles off the Precipice with such Fury, it makes an Arch under which 3 Men may pass a-breast without Danger.

1759 Brice — The above quotation is an interesting illustration of the backwardness of knowledge concerning Niagara even as late as 1759.

1759 — The annual register . . . of the year 1759. 4th ed. Lond.: J. Dodsley. 1765. 2:32.

A little above the fort is the cataract of Niagara, which is esteemed the most remarkable in the world, for the quantity of water and the greatness of the fall. This fall would interrupt the commerce between the lakes, but for a road which the French have made up the hilly country that lies by the streight; so that there is here a good carrying-place, and not very tedious; for after a portage of about eight miles, you reimbark again, and proceed, without any interruption to the Lake Erie.

As the great communication of those who go by water is along this streight, and carrying-place, so those who travel by land are obliged to cross it. The lakes are so disposed that without a somewhat hazardous voyage, the Indians cannot any otherwise pass from the north-west to the south-east parts of N. America for many hundred miles.

1760

1760 O'Callaghan — O'CALLAGHAN, E. B. The documentary history of the state of New York. Albany. 1849. 1:155, 157.

Governor Dongan asks permission to erect a "compayne Fort" "at Oneigra near the great lake in the way where our people goe a Beaver hunting or trading or anywhere else where I shall think convenient it being very necessary for the support of Trade, maintaining a correspondence with the further Indians, and in securing our rights in the country the French making a pretence as far as the Bay of Mexico, for which they have no argument than that they have had possession this twenty years by their fathers living so long among the Indians. . . ."

". . . . also I [Gov. Dongan] sent the arms of His Royal Highness now His Majesty to be put up in each castle as far as Oneigra."

O'CALLAGHAN, E. B. The documentary history of the state of New York. Albany. 1849. 1:201, 203, 232.

On page 201 Niagara is cited as a good place for a rendezvous against the Indians, on page 203 the Niagara post is recommended as a strategic

point between the lakes for the fur trade, etc., and on page 232 the importance of fortifying "Niagara, the most important in America" is dwelt upon. 1760 O'Callaghan

1762

BROOKES, R. The general gazetteer; or, Compendious geographical dictionary, in miniature. . . . Now much improved, and brought down to the present time, under the direction and inspection of the Rev. Jedidiah Morse. Lond.: J. Newberry. 1762. 1762 Brookes

The American Gazetteer. Containing a distinct account of the New World. . . . Lond.: A. Millar and J. and R. Tonson. 1762. Vol. 3. 1762

1763

Gazzetiere Americano. . . . Livorno: Coltellina. 1763. 3:5–6. 1763

1765

FENNING, D., COLLYER, J., *and others.* New system of geography. Lond.: Crowder. 1765. 2:641. 1765 Fenning

1767

O'CALLAGHAN, E. B. The documentary history of the state of New York. Albany. 1849. 2:792. 1767 O'Callaghan

"Map of Niagara River or the Straits between the Lakes Erie and Ontario" which shows the landing, the road of the carrying place, the Falls and the post at the upper end of the carrying place.

O'CALLAGHAN, E. B. The documentary history of the state of New York. Albany. 1849. 2:868.

Journal of Indian Transactions at Niagara, in the year 1767.

1770

O'CALLAGHAN, E. B. The documentary history of the state of New York. Albany. 1849. 2:871. 1770 O'Callaghan

Indian congress at Niagara.

1784

Calendar of N. Y. colonial mss. indorsed land papers; in the office of the secretary of state of N. Y. (1643–1803) Albany. Weed, Parsons & Co. 1864. P. 653. Sept. 7, 1784. 37:43. 1784

1784 Petition of Josh. Shurtliff, John Elliot, junr., and Wm. Colbrath for a lease of the Carrying Place at Niagara, and as much of the land adjacent as may be thought proper.

1791

1791 Calendar of N. Y. colonial mss. indorsed land papers; in the office of the secretary of state of N. Y. (1643–1803) Albany. Weed, Parsons & Co. 1864. P. 865. Dec. 1, 1791. 52:72.

Proposal of Walter Livingston, attorney of John Livingston, to pay $1.00 an acre for a tract of land one mile wide, and from forty to fifty miles long on the east side of the straight between lakes Erie and Ontario, including all the islands, but exclusive of the Fort of Niagara.

1791 Calendar of N. Y. colonial mss. indorsed land papers; in the office of the secretary of state of N. Y. (1643–1803) Albany. Weed, Parsons & Co. 1864. P. 866. Dec. 12, 1791. 52:82.

Letter from John Livingston to Walter Livingston expressing his surprise that he should have offered a dollar an acre for the tract along the Niagara river and directing that the proposal be changed to 75 cents an acre.

1792

1792 O'Callaghan O'CALLAGHAN, E. B. The documentary history of the state of New York. Albany. 1849. 2:1165–68.

Captain Charles Williamson's account of the route and distance from New York to Genesee county and thence to the Falls of Niagara. Beside the account of the taverns and distances there is some description of the country.

. . . Capt. Charles Williamson, who came to this country as the Agent of Sir Wm. Pulteney and Governor Hornby, for the settlement of their Lands in the Western part of the State of New York, in the year 1792. He remained as their Agent until the year 1802 when he returned to Europe. He afterwards made occasional visits to this Country until the year 1807, when he died of the yellow fever on a mission from the British Government to the Havanna.

SPENCER, O. M. Narrative of O. M. Spencer; comprising an account of his captivity among the Mohawk Indians, in North America. Revised from the original papers by the author of "Moral and scientific dialogues." Lond.: J. Mason. 1836. Pp. 234–235. 1792 Spencer

Other editions appeared in 1842 and 1854. In these the description of the Falls is a little more detailed than in the first edition. Allowance must be made for the fact that even the first account was written some forty years after the author had seen the Falls.

PAYNE, J. Universal geography. . . . Lond.: 1792. 2:657. 1792 Payne

1793

Calendar of N. Y. colonial mss., indorsed land papers; in the office of the secretary of state of N. Y. (1643–1803) Albany. Weed, Parsons & Co. 1864. P. 908. Feb. 4, 1793. 55:121. 1793

Proposal of John Livingston to pay 8s. an acre for a tract of land on the east side of Niagara river, reserved by the state in its cession to Massachusetts, being one mile wide and from forty to fifty miles long, including all the islands, and exclusive of the forts at Niagara, (from Buffalo to Fort Niagara.)

Calendar of N. Y. colonial mss. indorsed land papers; in the office of the secretary of state of N. Y. (1643–1803) Albany. Weed, Parsons & Co. 1864. P. 910. Mar. 14, 1793. 55:161.

Proposal of John Livingston to pay 9s. an acre for a tract one mile wide and between forty and fifty miles long on the east side of Niagara river.

EBELINGS, CHRISTOPH DANIEL. Erdbeschreibung und Geschichte von Amerika. Die vereinigten Staaten von Nordamerika. Hamburg; Carl Ernst Bohn. 1793–1796. 2:634–639. 1793 Ebelings

Account based on Kalm, Pouchot, Ellicott, and Dr. McCauslin. Gives dimensions, superiority in volume as compared with other falls, rainbows, winter scenery, recession. Scientific, impartial presentation of facts as given in authorities.

1796

WINTERBOTHAM, W. An historical, geographical, commercial and philosophical view of the United States of America, and of the European settlements in America and the West Indies. The first American edition, 1796 Winterbotham

1796 Winterbotham with additions and corrections. New York; Tiebout and O'Brien for Thomas Stephens. 1796. 1:183–184.

Just a paragraph concerning the height, sound and spray of the Falls.

1797

1797 Morse MORSE, JEDIDIAH. The American gazetteer, . . . 2d ed., corrected. Bost.: S. Hall. 1797.

1799

1799 Stevens STEVENS, ABEL. Life and times of Nathan Bangs, D. D. N. Y.: Carlton and Porter. (1863) P. 35.

A short description of Niagara Falls in 1799, by a prominent Methodist Episcopal clergyman.

1804

1804 Smith SMITH, THOMAS. The wonders of nature and art; or, A concise account of whatever is most curious and remarkable in the world: . . . London; J. Walker, etc., 1804. 9:219–223.

Very similar to Brookes, only longer. Apparently based on some earlier account.

1813

1813 Dunlop DUNLOP, WILLIAM. Recollections of the American war, 1812–14. Toronto: Historical Publishing Co. 1905. Pp. 56–58.

A brief but rather original account by an army surgeon stationed in a medical boarding-house at Chippewa in the summer of 1814.

1813 (A) Gazetteer of the province of Upper Canada: to which is added an appendix, describing the principal towns, fortifications and rivers in Lower Canada. N. Y.: Prior and Dunning. 1813.

1813 Smith SMITH, MICHAEL. A geographical view of the province of Upper Canada; and promiscuous remarks on the government; in two parts; with an appendix containing a complete description of the Niagara Falls. N. Y. Pelsue and Gould. 1813. Pp. 72–82.

Many writers have attempted to describe this curiosity of nature; yet all the descriptions that I have read, appear to me not to be sufficiently illustrative or correct: I will therefore describe it myself, in as plain a manner as possible, unadorned with any fanciful strokes of rhetoric.

In order to have a proper view of the falls, and adjacent parts,

I will suppose a person to be sailing, in a little boat, out of Lake Ontario, up the Niagara river or outlet of Lake Erie. 1813 Smith

After this introduction of his common-sense view of the Falls the author goes on to give a description of the points of interest which would be passed on such a trip as he suggests, gives the figures of the height and extent of the Falls, and his calculations as to the quantity of water. He does not believe that the Falls receded from Lewiston. He claims that he found the date 1606 marked on two trees near the falls.

SPAFFORD, HORATIO GATES. Gazetteer of the state of New York. . . . Albany: H. C. Southwick. 1813. Pp. 258–259. 1813 Spafford

Another edition appeared in 1824. The author had visited the Falls himself and wrote at first hand. In his later edition he added a description of the Falls in winter. His account is often referred to by early writers as authoritative.

1815

BEARDSLEY, LEVI. Reminiscences. . . . N. Y. C. Vinten. 1852. Pp. 147–150. 1815 Beardsley

Recollections of a visit made in the autumn of 1815. The author was a man of note in New York and wrote well of the Falls.

Sketches of scenery on Niagara River for the North American Journal. N. Am. rev., Mar. 1816. 2:320–329.) 1815

A brief description from the journal of a traveller who visited the Falls in July, 1815.

[MINOT, *Mrs.*] Sketches of scenery on Niagara river. (N. Am. rev., Mar. 1816. 2:320–329. 1815 Minot

This article, which was written in July, 1815, tells of the devastation wrought by the war in the Niagara region and describes in detail the scenery of the river and Falls.

[The Falls of Niagara have been often described; but the battles that have been fought in their vicinity, and the various fortune which influenced the events of the late war, have given a strong additional interest to the scenery. We are particularly flattered in being able to communicate the following extracts, from the journal of a traveler who visited the Lakes last summer. There are several remarks that strongly depict the hurry of the

1815 Minot

feelings, the dizzying emotion, and the confounding grandeur of the scene, and we think the reader will perceive some picturesque circumstances in the account of the cataract, that have not before been noticed. . . .] — Ed. note.

1819

1819 Hardie

HARDIE, JAMES. A dictionary of the most uncommon wonders of the works of art and nature. N. Y.: Samuel Marks. 1819. Pp. 275–278.

1819

Lines written immediately on first beholding Niagara Falls, July, 1815. (*In* Western review and miscellaneous magazine. Lexington. 1819. 1:127–128.)

1819 Mackenzie

MACKENZIE, ENEAS. An historical, topographical, and descriptive view of the United States and of Upper and Lower Canada. Newcastle-upon-Tyne: Mackenzie and Dant. (1819). Pp. 49–52.

A very good account of the Falls which shows familiarity with other accounts.

1820

1820 Darby

DARBY, WILLIAM. Brooke's universal gazetteer, or new geographical dictionary: . . . 3d Am. ed. Phila.: Bennett and Walton. 1820. P. 553.

A really admirable account for the purpose, considering the time, and as accurate and scientific as could be expected.

1820

Geographical, historical, commercial and agricultural view of the United States of America. . . . Lond.: Edwards and Knibbs. 1820. Pp. 18–20.

Quotation from a "recent traveller."

1821

1821 Bingley

BINGLEY, WILLIAM. Travels in North America, from modern writers. With remarks and observations, exhibiting a connected view of the geography and present state of that quarter of the globe. Designed for the use of young persons. Lond.: 1821. Pp. 37–40.

1821 Morse

MORSE, JEDIDIAH *and* RICHARD C. A universal gazetteer, or geographical dictionary, . . . 3d ed. rev. and corrected. New Haven: S. Converse. 1821. P. 531.

TAYLOR, ISAAC, *Rev.* Scenes in America, for the amusement and instruction of little tarry-at-home travellers. Lond.: Harris. 1821. Pp. 101–103. **1821** Taylor

Contains a poem on the Falls and a brief description, which mentions Goat Island as still inaccessible.

1822

KELLY, CHRISTOPHER. A new and complete system of universal geography. Lond.: Kelly. 1819–1822. 1:548–549. **1822** Kelly

1823

HULBERT, CHARLES. Museum Americanum; or, Select antiquities of nature and art in America. . . . Lond.: Whittaker. 1823. Pp. 147–149. **1823** Hulbert

Quotations from Simond, Howison and Weld.

PRIOR, SAMUEL. The universal traveller, containing the popular features and contents of the best standard modern travels in the four quarters of the world. London. 1823. Pp. 579–582. **1823** Prior

Schoolcraft's account.

1824

GALT, JOHN. The bachelor's wife. Edinb.: Oliver and Boyd. 1824. Pp. 285–292. **1824** Galt

The author makes favorable comment on Howison's description, which he quotes at length.

SEAVER, JAMES E. A narrative of the life of Mrs. Mary Jemison. Canandaigua: J. D. Bemis and Co. 1824. Pp. 145–149. **1824** Seaver

An appendix contains "an account of the destruction of a part of the British army, by Indians, at a place called the Devil's Hole, on the Niagara River, in the year 1763."

1827

JOHNSTON, CHARLES. A narrative of the capture, detention, and ransom of Charles Johnston of Botetout county, Virginia, who was made prisoner by the Indians on the river Ohio, in the year 1790: together with an interesting account of the fate of his companions, five in number, one of whom suffered at the stake. To which are added, sketches of Indian character and manners, with illustrative anecdotes. New York; J. and J. Harper. 1827. Pp. 87–88. **1827** Johnston

A brief paragraph written long after the author's visit to the Falls.

1827 A trip to Niagara. By a Washingtonian. (So. lit. messenger, Nov. 1827. 3:657–664.)

An interesting description of the journey and of the Falls with their effect upon the feelings of the writer.

The effect upon the feelings, of this gigantic prodigy of nature [the Falls] may not be easily described. I have frequently read of the sentiment of his own nothingness which it excites in the bosom of the beholder. With me it had no such effect. I felt as if in the immediate presence of the great Creator — his heavenly bow of peace and beauty hanging over the vapor tribute of waters. My mind was filled with ideas of immensity and power, and my soul seemed divested of its load of earth, and hovering in contemplation towards the great source of existence — material and intellectual — at whose word the seas were filled with waters. . . . Elevated to such feelings by even the comparatively feeble picture before me, of his attributes of power and goodness — so thought I, and so I felt at Niagara — for my soul could only contain this absorbing sentiment — *The Creator, God — is here!*

1828

1828 Darby DARBY, WILLIAM. View of the United States, historical, geographical, and statistical; exhibiting, in a convenient form, the natural and artificial features of the several states. . . . Phila.: Tanner. 1828. Pp. 209–216.

A description, in rather formal style, of the beauties of the Falls, and the principal points of interest, scenic and historical.

1828 Eastman EASTMAN, F. S. A history of the state of New York from the first discovery of the country to the present time. N. Y.: Bliss. 1828. Pp. 5–6.

1829

1829 Macauley MACAULEY, JAMES. The natural, statistical and civil history of the state of New York. N. Y.: Gould and Banks. 1829. 1:212–217.

1829 Woodbridge WOODBRIDGE, WILLIAM C. Rudiments of geography on a new plan. 11th ed. Hartford: Cooke. 1829. P. 62.

1832

FLINT, TIMOTHY. History and geography of the Mississippi valley. . . . 2d ed. Cincinnati: Flint, Lincoln. 1832. 1:443–445. 1832 Flint

"Take it all in all," says the author, "it is one of the most sublime and astonishing spectacles, seen on our globe."

Falls of Niagara. (Sat. mag., Dec., 1832. 1:250–251.) 1832

1833

DAVENPORT, *Bishop*. A new gazetteer, or geographical dictionary, of North America and the West Indies. . . . Balt.: M'Dowell. 1833. P. 356. 1833 Davenport

1836

THE FALLS OF NIAGARA. (Penny mag., Oct. 15, 1836. 5:405–406.) 1836

A description of the delirium of a first visit to Niagara and later impressions.

GORDON, THOMAS F. Gazetteer of the state of New York. . . . Phila. 1836. 1:17–22. 1836 Gordon

1837

MURRAY, HUGH. The encyclopedia of geography; . . . rev., with additions, by Thomas G. Bradford. Phila.: Cary, Lee and Blanchard. 1837. 3:366. 1837 Murray

1838

DEARBORN, HENRY A. S. Memorandum of a journey to the Niagara frontier for the purpose of negotiating treaties with the Seneca & Tuscarora tribes of Indians. (Buf. Hist. Soc., pub., 7. See index.) 1838 Dearborn

The author made the journey in question in 1838 and as the representative of the state of Massachusetts. His account contains a description of the roadway between Buffalo and Niagara Falls, an Indian legend of the Cave of the Winds behind the Falls, and an early estimate of the power of the Falls.

Tradition of the Indian Settlement on Buffalo Creek

1838
Dearborn

There was a powerful tribe whose village was near the Niagara Falls, on the Canada side. For several years the corn crops failed from drought, an frosts, & an epidemic prevailed, which swept off many of the Indians. One day a girl went into the little cave above the falls to bathe, when a rattlesnake attacked her & in her effort to escape, she was carried down the rapids, & precipitated into the abyss below the cataract. to her astonishment she was uninjured & found herself in a cavern, under the falls, in the presence of the God of Thunder & Lightning, who there created the mist, which ascending into the heavens, formed clouds, from whence the lightnings are launched. He told the girl that the God of Starvation, or Famine, had his residence also, under the falls, & had caused the failure of the crops of corn, as he was a very bad & wicked god; and there was also an immense water serpent under his command which lived in the niagara river and lake Erie;— this serpent came down often into the little bay, at the mouth of the stream, which falls into the river just above the falls, to cleanse himself of the filth which accumulated on his skin, & that the water was thus poisoned in that little bay; which being the place where the indians supplied themselves with water for drinking & cooking they were made sick & died. Now said the Thunder & Lightning God, go home to your tribe & tell them to pack up all their property & procede in their bark canoes from the mouth of Chippewa river up the Niagara to Buffalo creek, & form a settlement, where the stream is separated into two branches, & they will raise good crops & enjoy perfect health. The God of Starvation will send the large Water Serpent after you, for the purpose of defiling the water of the creek; but I will follow him in a dark cloud, & when he has advanced a few miles up the creek, I will hurl a thunderbolt at him, & slay him. The Indians made the removal, as recommended, & saw the huge serpent following their canoes; but when they got

to the place where they were to land, they heard a thunder clap & saw a flash of lightning strike the monster when he floundered turned round & lashed the water with his tail with great violence, & fled down the Creek, which was rendered bloody from the wound made in the serpent, & he was so large that in turning round he scooped out a deep & broad basin, in the creek, which exists at this day. After the indians had landed & got their temporary camps made, the girl informed them, that they must send a deputation down to their old town, near the falls, & they would then ascertain the truth of the promises of the thunder God, for he had instructed her to communicate that intelligence. A deputation departed forthwith in their canoes, & when they reached the little bay they found the immense water serpent dead & in a state of putrefaction,— & on going into the village, they saw a pole 40 feet high, erected in front of the Council House, from which was suspended the thigh & legs of the God of Starvation, which were so emaciated & lean, that they appeared only skin & bones. It was so large that although secured by the upper end of the thigh to the top of the pole, the foot touched the ground. Having thus ascertained that the God of Starvation & his great water snake were both dead, they returned & reported the remarkable facts to the nation; & ever after the indians enjoyed good health & had fine crops of corn. 1838 Dearborn

. . . . .

The water power of Niagara falls has been estimated to be equal to all the other water power & steam power of the U. S. England, Scotland & Ireland. It was gauged by an English gentleman & reduced to horse power & the number were as great as has been above stated. The mills and manufactories & iron works which will be established at Black Rock will be beyond any other example & that in a few years,— not 20 will pass without an astonishing result having been thus produced. It will be an entire dense city & manufacturing region from Buffalo to Tonnawanda Creek. The future for that district of country is of mighty & startling promise.

1839

1839 Mellen

MELLEN, GREENVILLE, *ed.* Book of the United States. . . . N. Y.: Smith. 1839. Pp. 63–67.

Has a chapter on "Cataracts and cascades" in which he quotes Schoolcraft's description of Niagara Falls.

1840

1840 Cramer

CRAMER, CHARLES. Etwas über die Natur Wunder in Nord America. Zweiter Abschnitt. St. Petersburg: Gretsch. 1840. Pp. 6–9.

1840 Goodrich

GOODRICH, S. G. A pictorial geography of the world. . . . Bost.: Otis, Broaders. 1840. Pp. 231–236.

Some general information together with Greenwood's description, which is quoted at length.

1841

1841 Barber & Howe

BARBER, JOHN W. *and* HOWE, HENRY. Historical collections of the state of New York. N. Y.: S. Tuttle. 1841. Pp. 352–357.

Matters of general scenic and historical interest for the visitor to the Falls. Illustrated by a more or less fanciful view of the Falls taken from the ferry.

1843

1843 "Aquarius"

"AQUARIUS." Thoughts at Niagara. (Knick. mag., Sept., 1843, 22:193–196.)

Reflections on government and institutions suggested by analogy and comparison of the two Falls.

1843 E. S. C.

E. S. C. A legend of the Manitou rock. Containing also Professor Lyell's lecture upon the recession of Niagara Falls. Buffalo: Faxon. 1843.

A tragic tale of the love of a white man for an Indian maiden and the dire vengeance of her Indian lover, the whole based upon a tradition related by Father Hennepin.

1843 Haskell & Smith

HASKEL, DANIEL *and* SMITH, J. CALVIN. Complete description and statistical gazetteer of the United States of America. . . . N. Y.: Sherman and Smith. 1843. P. 472.

1844

1844 Brown

(BROWN, JAMES BRYCE.) Views of Canada and the colonists, embracing the experience of an eight years' residence; views of the present

state, progress, and prospects of the colony; with detailed and practical information for intending emigrants. 2d ed. Edinb.: A. and C. Black. 1844. Pp. 90–92. 1844 Brown

A visit to Niagara. (Lit. liv. age, Nov. 2, 1844. 3:37.) 1844

A quotation from the *United Service Magazine* describing an August visit. A lively, though rather cataloguing, description of the usual points of view and the usual experiences.

1846

CLINTON, G. W. Sketches of Niagara Falls and river by Cousin George. Buffalo. 1846. 1846 Clinton

FRENCH, BENJAMIN FRANKLIN. Louisiana historical collections. N. Y.: Wiley and Putnam. 1846. 1:249–250. 1846 French

A description of the English province of Carolana, by the Spaniards called Florida, and the French La Louisiane,* as also of the great and famous river Meschacebe or Mississippi, the five vast navigable lakes of fresh water, and the parts adjacent . . . By Daniel Coxe.

At the north-east end of this lake is another canal forty miles long, and in most places a league broad, called by the natives Niagara, having a delicate, level, beautiful, fertile country on each side of it; but being passed about two-thirds of the way, it is straitened by mighty rocks, and precipitates itself several hundred feet, being the greatest cataract that hath ever yet come to our knowledge, in the whole world. This lying within five or six days' journey of Albany and Schenecteda (two remarkable towns and fortifications of New York), and adjacent unto our confederates or subjects the Five Nations, (by the French called Irocois), especially the Sonnontovans (by some named Senecas), the most populous of the five, I have received an

* This account of Louisiana has been very carefully drawn up from Memoirs and Journals kept by various persons sent into the Valley of the Mississippi, by D. Coxe. The expedition fitted out by him, consisting of two ships, commanded by Capt. Barr, were the first to sail up the Mississippi. (1598)

1846 French

account from divers persons, who have with great attention and curiosity viewed it, suiting very well with the description Hennepin gives thereof, who had been there several times. The noise of such a multitude of waters falling from so great a height is so extraordinary, that although the country is very pleasant, level, and fruitful below the fall, yet the Sonnontovans were not able to bear it, but were forced to remove, and settle two leagues lower. I have had it from very credible people, that when the wind sets due south, they have heard it distinctly above thirty miles.

The impossibility of this account having been written in 1598 is clearly evident from the allusion to the fortified towns of Albany and Schenectady, which were not in existence at that period.

1847

1847

The Falls of Niagara. (*In* Glimpses of the wonderful. N. Y.: Wiley and Putnam. 1847. Pp. 73–82.)

1850

1850 Martin

MARTIN, ROBERT MONTGOMERY. British colonies; their history, extent, condition and resources. Lond. and N. Y.: J. and S. Tallis. (1850?) Div. I:74–75.

A statement of leading facts connected with the Falls.

1851

1851 Mather & Brockett

MATHER, J. H. *and* BROCKETT, L. C. A geographical history of the state of New York. Utica: Fuller. 1851. Pp. 348–349.

1852

1852

The Falls of Niagara. (Home friend. Lond.: 1852. 1:510–511.)

1852

(Niagara in winter.) (Harp., June, 1852. 5:127.)

An exquisite description, in light and easy style and casual manner, of the winter scenery of Niagara.

1853

1853 Fisher

FISHER, RICHARD SWAINSON. A new and complete statistical gazetteer of the United States of America. N. Y.: J. H. Colton. 1853.

1854

ROY, JENNET. History of Canada. . . . Montreal: Ramsey. 1854. Pp. 226–229. **1854** Roy

An account written for "British American youth" and very well done.

1855

LACHLAN, *Maj.* R. Account of an extraordinary sudden fall in the waters of the Niagara River. (Can. jour. (Can. inst., ser. 1) Apr., 1855. 3:204–205.) **1855** Lachlan

LILLIE, A. Canada: physical, economic, and social. Toronto: Maclear and Co. 1855. Pp. 65–67. **1855** Lillie

MEADOWS, J. From the stone tower at Niagara. (Lit. liv. age, Aug. 11, 1855. 46:351.) **1855** Meadows

Quotation from the *Traveller* describing a June visit.

(Niagara in winter.) (Harp. mo., Feb., 1855. 10:410–411.) **1855**

Another exquisite "Easy Chair" description of a winter visit.

1856

MIX, EBENEZER. Tragedy of the Devil's Hole. (Seaver, Life of Mary Jemison, De-he-wa-mis. 4th ed. N. Y. and Auburn. 1856. App. I, pp. 273–277.) **1856** Mix

An account of an Indian grant of land at the Falls.

The escape of Mr. Stedman, not only from the iron grasp of one of their most athletic and powerful warriors, but from the shower of rifle balls discharged at him from the rifles of their best and most unerring marksmen, confounded the Indians with wonder and fear, furnishing a subject whereon to feed their most absurd, superstitious whims. They at once pronounced him a favorite of the Great Spirit; and to appease its wrath, made Stedman a present of the tract of land he had encompassed in his retreat to Fort Schlosser; to wit, beginning at the Devil's Hole; thence running east, to Gill creek; thence southerly down the creek, to the Niagara River; thence west, down the river, to Niagara Falls; and thence northerly, still bounding on the river, to the place of beginning; being a tract about two miles wide, and three

1856
Mix

and a half miles long. But neither the British government, nor the United States, or either of the states, has ratified or confirmed the gift; although Jesse Ware, claiming under Stedman, has, for a number of years in succession, assailed our legislative halls for the land, or some remuneration therefor. Nor does it appear that even the Indians themselves, after the excitement produced by the transaction had subsided, recognized any validity in Stedman's title; for the next year, 1764, they ceded the same tract, together with other lands, extending north to Lake Ontario, to the king of Great Britain, for a carrying-place around the Falls of Niagara.

1859

1859
Blume

BLUME, JUSTICE JARVIS. Across Niagara on a man's back. No publisher. N. D.

A pamphlet of sixteen pages describing Blondin's tight-rope passages across the Niagara as related to the author by Harry Colcord, the man whom Blondin carried across on his back.

But the horrors of the journey are best related by the man who sat on Blondin's back and participated in them — Harry Colcord.

Blondin was not quite confident of the success of the undertaking himself. He had been across a few times, but without me on his back, and he did not know what effect the additional weight might have on the rope. His earnest advice to me before starting was:

" Harry, be sure and let yourself rest all the time like a dead weight on my back. If I should sway or stumble, on no account attempt to balance yourself."

I determined to follow his advice. My first thrill occurred as we started; over the pine trees, whose sharp tops bristled far below us between the cliffs and the river, it seemed far more terrifying than out over the water. My heart was in my mouth as we began to descend the rope, which from its weight had a depression of fifty feet in the center; but it was a matter of life or death, and I resolved to follow Blondin's advice most

implicitly. I had absolute confidence in the man beneath me and I believed he would get us both across all right. So on we went, though from the first our progress seemed to me dreadfully slow. 1859 Blume

The most serious risk and ordeal seemed to be getting on and off his back. Just think of the situation — getting down off a man's back, feeling with your foot for a taut, vibrating rope, then standing on the same, while it swung to and fro, some hundreds of feet in air, and holding on to a man in front of you clad in slippery tights, when the least false move or loss of presence of mind of either might plunge you both into eternity, and then climbing again upon his back — and this had to be repeated seven times!

The sight of the rapidly flowing, seething, tumultuous current beneath us gave me a peculiar sensation; it was that we were moving at a great rate up the river and making but little progress to the opposite bank. From the immense depth the roar of the waters rose like the united voices of a thousand demons.

The guy lines, placed twenty feet apart, kept the rope comparatively steady till we reached the space of forty feet in the center, where there were no guy lines. We had made about ten feet of this forty, when suddenly Blondin tottered and swayed in an effort to walk straight, his pole going furiously up and down. He had lost his balance and was unable to regain it!

In that awful moment his advice most forcibly impressed itself on me, and I strictly followed it, resting passively, numbly, like a dead weight on his shoulders, to stay or fall with him as might happen. Discipline rose superior to instinct.

Unable to regain his balance he ran along the rope — the impetus keeping us up, the pole thrashing madly up and down — for thirty feet, when we reached the first guy line on the opposite side. On this line he stepped, when it immediately broke, and the main rope, pulled by the corresponding guy line, was jerked sidewards.

This was the most critical moment of all. With his wonderful

1859
Blume

agility he recovered himself just in time and won equilibrium enough to run to the next brace of guy lines, twenty feet away, where he halted.

"Get off, quick," he said, and I obeyed.

He was like a marble statue; every muscle was tense and rigid; large beads of perspiration trickled from him. It was then I most admired his wonderful grit and coolness. Neither by voice nor sign did he manifest his knowledge of the fact that a dastardly attempt had just been made to kill us, probably by some unscrupulous and murderous gambler or gamblers who had adopted this method of trying to save their miserable stakes.

Again I got on his back, and by and by we toiled up the incline of the rope toward the American shore, confronting a great sea of staring faces, fixed and intense with interest, alarm, fear. Some people shaded their eyes, as if dreading to see us fall; some held their arms extended as if to grasp us and keep us from falling; some excited men had tears streaming down their cheeks. A band was trying to play, but the wrought-up musicians could evoke only discordant notes.

"Look out, Blondin," I said, "here comes our danger, those people are likely to rush at us on our landing and crowd us over the bank."

"What will I do?" he asked.

"Make a rush and drive right through them," I said, which he successfully did. And the scene and excitement that followed our arrival on terra firma was truly indescribable. Cheers rose louder than Niagara and everybody seemed crazy. The journey — to me an age — had occupied forty-five minutes.

1859
Trotter

(TROTTER, ISABELLA STRANGE.) First impressions of the new world on two travelers from the old in the autumn of 1858. Lond.: Longman, Brown, Green, Longmans, Roberts. 1859. Pp. 50–61.

Letters by a mother to her daughter, descriptive of a journey made by father, mother, and brother of the daughter in question. An ordinary gossipy account, concerned more with the doings of the family than with the scenery.

1860

Canada seventy years ago. 3d ed. St. Catherines, Ont. 1860. **1860**

FRENCH, J. H. Gazetteer of the state of New York. . . . Syracuse: Smith. 1860. Pp. 449–450. **1860 French**

1861

"Maid of the mist" shooting the Niagara rapids. (Harp. w., June 22, 1861. 5:389.)

WILKES, GEORGE. The fall of Table Rock: by the last man that stood on it. (Lit. liv. age, May 25, 1861. 69:472.) **1861 Wilkes**

The fall of June, 1850.

1864

KETCHUM, WILLLIAM. An authentic and comprehensive history of Buffalo. . . . Buffalo: Rockwell, Baker, and Hill. 1864–1865. I:51–55. **1864 Ketchum**

Hennepin's account, London, 1698.

1865

MARSHALL, O. H. The Niagara frontier, embracing sketches of its early history, and Indian, French and English local names; read before the Buffalo historical club, Feb. 27, 1865. (Buf. Hist. Soc., pub., 1880. 2:395–429.) **1865 Marshall**

Information concerning the name Niagara, early notices of the Falls, the scenery, and early manufactures.

Niagara. (Mag. Am. hist. April, 1887. 17:349:350.) **1865**

A discussion of the origin of the name Niagara from the historical writings of Orsamus H. Marshall.

1866

Niagara by night. (Leisure hr., May 12, 1866. 15:301.) **1866**

Niagara in winter. (Lit. liv. age, Mar. 17, 1866. 88:799.) **1866**

A quotation from the *Evangelist* descriptive of a visit to the Falls on January 24, 1861.

1869

NEAL, JOHN. Wandering recollections of a somewhat busy life; an autobiography. Bost. Roberts Bros. 1869. **1869 Neal**

1869
Neal

The author's visit to Niagara was in 1833. In his reminiscences he gives a humorous account of writing the poem entitled the Battle of Niagara before he had ever seen the Falls.

1871

1871

First impressions of America. (Leisure hr., June 3, 1871. 20:-344–346.)

1871

Niagara. (Hist. mag., Jan., 1871. 2d ser., 9:79.)

It is a standing tradition of the Niagara Indians, shared to a great extent now by the white people in the vicinity of the Falls, that the "Great Spirit," or Thunderer of Waters, must have, annually, four victims sacrificed to his power. Curiously enough, a year seldom passes during which at least four persons are not drowned, either in the Falls or the whirlpool, below. This year, an old man of more than seventy years stepped into the breakers, above the Falls, and loosing his hold, was swept over the frightful cataract. At De Vaux College, a student, daring his companions to wade into the whirlpool, was sucked into its terrific eddies, and instantly disappeared, to be seen no more. A few days afterward, a drunken father adventured with his two children and a reprobate companion, into a boat, above the rapids, and, in their drunken orgies, the little ones were thrown out and drowned, though the two drunken wretches escaped. So far, therefore, the Indians believe, implicitly, in the fourfold sacrifice; and each year's disasters confirm their belief.

1871

A wrestle with Niagara. (Every Sat., Aug. 12, 1871. 11:167.)

A graphic and detailed description, by an eye witness, of attempts to rescue a man from the rapids and their ultimate failure.

1871

A wrestle with Niagara. (Lit. liv. age, Aug. 19, 1871. 110:509–511.)

1872

1872
Garczynski

Garczynski, R. E. Niagara. (*In* Bryant, William Cullen, *ed.* Picturesque America. N. Y.: Appleton. (1872) (1:432–451.)

A well-written and detailed description of all the sights at all seasons.

From Amérique Septentrionale — Etat de New-York

NIAGARA FALLS FROM THE AMERICAN SIDE

From a Lithograph of a sketch by J. Milbert, 1818

HOLLEY, GEORGE W. Niagara, its history and geology, incidents and poetry. . . . N. Y.: Sheldon. 1872. **1872** Holley

PORTER, ALBERT H. Reminiscences of Niagara from 1806 to 1872, with a list of the early settlers. By an old resident. Printed for private circulation. Niagara Falls: Pool. 1872. **1872** Porter

There seem to have been several editions of this article. The writer's design was, in his own words, "to trace the origin and growth of the Village of Niagara Falls; and to furnish a list, as full and correct as possible, of the early settlers of the village and vicinity, with the date of their respective settlement." His account contains much matter of the greatest value and interest concerning the development of manufacturing at the Falls.

Western New York, until after the Revolution, and settlement of the conflicting claims of Massachusetts and New York, down to 1788, was owned and occupied by the Indian tribes, except a few isolated points, appropriated from an early period to military purposes, by the French and English; and was chiefly known through the reports of Jesuit priests, and adventurous travellers. The points referred to, were Forts Oswego and Niagara, the landing place, afterwards named Lewiston, and Fort Schlosser. Fort Schlosser was not the original name of the old fort, situated about a mile above the falls. It was originally a French post, and was called Little Niagara. It was destroyed in 1759, after the surrender of Fort Niagara to Sir William Johnson. A small stockade work was afterward erected by the English near the same place, and called Fort Schlosser. The early settlers of this region well remember the noted chiefs Corn Planter, Red Jacket and Farmer's Brother, representing the Indians in treaties, ceding the territory of Western New York. They were men of great influence among their people, and were treated by the whites, in early days, with great consideration and respect.

Augustus Porter, who was the first purchaser and settler at this point, after the English occupation ceased, first visited the Falls in 1795, and again in 1796, then on his way with a large company of surveyors to explore and survey what is now known

1872
Porter

as the Western Reserve, in the State of Ohio, but at that time constituting a part of the great Northwestern Territory. His first impressions of this locality were decidedly favorable; and taking into consideration its position on what was then, and seemed likely to continue to be, the great thoroughfare from east to west, with the vast water power, that, as settlement progressed, must become highly valuable, he could not but regard it as a point worthy of attention, whenever the land, then the property of the State, should be opened for sale and improvement.

In 1805, the State of New York first offered these lands along the Niagara River for sale, and Augustus Porter and Peter B. Porter, and Benjamin Barton and Joseph Annin jointly, purchased largely of the lands at Lewiston, Niagara Falls, and Black Rock, and elsewhere along the River.

Augustus Porter settled first at Niagara Falls, and shortly after, Benjamin Barton at Lewiston, and Peter B. Porter at Black Rock. In the summer of 1805, Augustus Porter built, on the joint property at Niagara Falls, a saw-mill and blacksmith shop, preparatory to other improvements; and in 1806 removed with his family from Canandaigua, to a dwelling then standing near old Fort Schlosser. The journey from Canandaigua to Niagara then required three or four days, and from Albany eight or ten days. During the War of 1812, government messages were transmitted by express riders, by the most direct route to Washington. But until 1815, we had only a weekly mail carried on horseback. And until 1818 the mail stages were five days between Albany and Buffalo.

No erections or improvements of any kind had been made in the vicinity of the Falls, from the time of the English surrender of the country to 1805; and what had been previously made by the French and English were then in ruins, except the dwelling house referred to. That house had been built under the English rule, and had been occupied for many years by John Steadman, who afterward claimed a large tract of land along the Niagara River, embracing the Falls, by a pretended Indian title, under

which his heirs brought a number of unsuccessful ejectment suits, as late as 1823. During the time of his occupation of the house and lands at Schlosser, Steadman planted the old orchard near the river, a portion of which still remains. He also made some use of an old saw-mill, built by the French on the site of the old grist-mill, on Lot No. 11, Canal Street. Steadman also visited Goat Island and established a colony of goats there, from which the island derived its name. These goats all perished in the winter of 1780, memorable for its severity. At that time, or previously, ten or twelve acres of land had been cleared on the high ground opposite the head of Goat Island. The cleared fields at Schlosser, occupied by Steadman, contained probably about sixty acres. 1872 Porter

In 1806 little had been done to change the wild aspect of the country; and bears and wolves were not uncommon in the forests. The latter were so numerous as to prevent the keeping of sheep, for many years. They would frequently approach by night within a short distance of the Steadman house; and their hideous nightly howlings were familiar sounds in all the region around the Falls. Wild geese and ducks abounded in the river; eagles were common, and swans were occasional visitors. Deer were frequently seen on Goat Island. On one occasion a deer was driven into the river near the head of the Island, and making his way safely through the rapids, escaped his pursuers; and another, pursued to the lower end of the Island, made a desperate and fatal leap through the cedars and over the precipice.

In connection with the purchase of lands by Augustus Porter and his associates, they took from the State a long lease of the landing places, at Lewiston and Schlosser, granting the exclusive right of transportation across the portage, they being required to provide warehouses and teams, to meet all demands for transportation, at fixed rates. They were induced also, in aid of this interest, to build a number of vessels on Lakes Ontario and Erie; so that for several years the transportation between Oswego and the upper lakes, was carried on chiefly by the firm of Porter,

1872 Porter

Barton and Co. They supplied all the military posts; and provided all the means of transportation required by the large Indian Traders, and Fur Companies, of that period.

In 1807 the first grist-mill was built by them at Niagara Falls, and in order to obtain the force required to raise the frame, they were obliged to send to Fort Niagara, for a detachment of soldiers.

In 1808 Augustus Porter erected his dwelling house, destroyed during the war of 1812, and re-built on the same site in 1818.

From 1808 to 1812 other improvements were made. A rope manufactory was established on a very liberal scale, in which cordage was manufactured for lake vessels, both American and English. The supply of hemp was raised on the Genesee river flats. A tannery, and a carding and cloth dressing establishment, a large log tavern, and ten or twelve comfortable dwelling houses were erected at an early period.

Previous to 1812 most of the large trees north of Bridge Street had been cut down, but the young trees and undergrowth, particularly near the river, grew very thick and close, quite down to the Falls.

On the Canada shore, with the exception of a small plot of dry ground where Barnett's Museum now stands, the whole flat from Table Rock to the Clifton House, was a wet cedar swamp. Cedars also grew thickly on the declivities below the perpendicular banks on both sides of the river, adding much to the general effect of the scenery.

For several years the descent to the ferry below the Falls, was down the rugged precipice, near the present inclined plane, with the aid only of bushes growing out of the crevices of the rocks, and by means of logs placed at an inclination, with notches cut for steps, answering the purpose of short ladders. The river crossing was made in a common canoe. At a later period, an improvement was made on the primitive plan, by the erection of long ladders, connected and extending from top to bottom of the precipice.

In June 1812, on the declaration of war between the United States and Great Britain, most of the inhabitants removed to the interior, but generally returned and remained until December 1813; when the British and their Indian allies invaded and laid waste our defenceless frontier. Buildings and property of every description were destroyed; many unresisting persons were killed; and others only escaping with their lives, were in some cases reduced to extreme want and suffering. Nothing was saved, except two or three small dwellings and the log tavern, set on fire, but extinguished by persons at hand, after the hasty departure of the enemy. No buildings were again erected until after the close of the war, in 1815. 1872 Porter

. . . . .

At the conclusion of the war most of the inhabitants returned, the mills and dwellings were rebuilt, and other improvements were made from time to time. Goat Island was purchased of the State by Augustus Porter in 1816. It had been frequently visited both by the Indians and whites but was of no practical use unless connected to the main land by a bridge.

In 1817 the proprietor constructed a bridge near the upper end of the Island. It proved insufficient to resist the rapid current, and heavy masses of ice, and was partially carried away the following winter. In 1818, another bridge was constructed, on the site of the present iron bridge, which has proved a perfectly secure position. For the old bridge of wood, an iron bridge was substituted in 1856.

A Woolen Factory was erected in 1820; a Forge Rolling Mill and Nail Factory in 1822; and a Paper Mill in 1823, now one of the largest in the country.

In 1829, as a matter of experiment and curiosity, the old schooner Michigan was sent over the Falls. . . . Her course was well directed toward the center of the Horseshoe, and though submerged from twelve to fifteen feet, she passed smoothly over, proving the great depth of water at that point.

In December 1837, during the Canadian Rebellion, an event

1872
Porter

occurred, at what is known as Gill Creek or Upper Schlosser Landing, about two miles above the Falls, of more than local interest; known far and wide through the country, as the "Caroline affair." A small American steamer, called the Caroline, had been employed for several days in transporting men and supplies in connection with an organized military force, composed chiefly of American citizens occupying Navy Island, and threatening the invasion of Canada. It being understood that the Steamer was moored at night, at the dock on the American shore, an expedition conducted by Alexander McLeod, left Chippewa in the night, and reaching the American shore unobserved, captured the steamer, leaving one man dead on the dock, and dispersing the crew. The steamer was then towed out into the river, set on fire, and left to drift over the Falls. This high handed act, excited great popular indignation, and for a time seriously threatened the peace of the two countries. In what manner this danger was averted, and friendly relations finally restored, the public records of that period will show.

. . . . .

In 1845, the inclined plane at the ferry, with cars operated by water power, was substituted for the old plan of ladders, and winding stairs previously in use.

The Railroad to Buffalo was opened in 1836. The Railroad to Lockport was also opened in 1836, and extended to Rochester in 1852. The Canandaigua and Niagara Falls Railroad, by way of Batavia, was opened in 1853; and the Erie Junction Railroad in 1871.

The first Suspension Bridge across the river, was erected in 1848, by Charles Ellett, intended only as a temporary work by which to construct the permanent bridge. The present Railroad Bridge was completed in 1855, on the plans and under the personal superintendence of John A. Roebling. . . .

The new Suspension Bridge, near the Falls, was opened for passage in 1869.

The first Steamboat launched below the Falls was in 1848,

and the second in 1854. In 1861 the latter, proving an unprofitable enterprise here, departed for another port, and was safely navigated through the rapids to Lewiston. 1872 Porter

The Hydraulic Canal, several years in construction, was completed in 1862.

The Cataract House was built, in part, in 1824, . . .

The International Hotel . . . occupying the site of the primitive *log tavern*. . . .

1873

"The big falls." (Once a wk. July 19, 1873. 29:50.) 1873

This article consists, for the most part, of quotation from Tyndall.

STEINWEHR, A. W. A. F., *baron von*. The centennial gazetteer of the United States. . . . Phila.: McCurdy (1873.) Pp. 646–647. 1873 Steinwehr

1874

MARSHALL, ORSAMUS H. First visit of de La Salle to the Senecas made in 1669. No. imp. Pp. 31–32. 1874 Marshall

A translation of an account by Galinée, the original of which was obtained from a manuscript copied in the *Bibliothéque Nationale* by Margry and given to Mr. Marshall. The sketch was read before the Buffalo Historical Society, March 16, 1874.

STATE OF NEW YORK. Report of the Regents of the University on the boundaries of the state of New York. Albany: Argus. 1874. I:104–105. 1874

WHETHAM, J. W. BODDAM. (Western wanderings: a record of travel in the evening land. Lond.: Richard Bentley. 1874. Pp. 20–27.) 1874 Whetham

This writer viewed the Falls from both the Canadian and American sides, after obtaining his first view from Goat Island. He felt that in spite of his great anticipations the reality surpassed all expectation. The annoyance of the "touts" and the tolls detracted somewhat from his enjoyment.

1877

Scene at Niagara Falls — Buying mementos. (Harp. w., June 9, 1877. 21:441.) 1877

A protest against the peddler pest.

1881

1881 Carpenter — Carpenter, William Lant. The falls of Niagara in winter. (Nature, Mar. 31, 1881. 23:511–514.)

1881 — Niagara in winter dress. (Harp. w., Mar. 5, 1881. 25:158.)

1882

1882 Sharpe — Sharpe, William. The international temple of Niagara. (Lond.) 1882.

1883

1883 — Folly and courage at Niagara. (Knowl., Sept. 7, 1883. 4:152–153.)

A New York Times letter from Niagara Falls giving an account of accidents and hairbreadth escapes.

1883 Greenwood — Greenwood, Thomas. A tour in the states and Canada. Out and home in six weeks. Lond.: Gill. 1883. Pp. 69–73.

Somewhat more personal, less matter-of-fact than the ordinary guide.

1883 Holley — Holley, George W. The falls of Niagara with supplementary chapters on the other famous cataracts of the world. . . . N. Y.: Armstrong. 1883. Pp. 1–163.

A revision and enlargement of an earlier work on the history and geology of the Falls.

1883 — Review of G. W. Holley's "The falls of Niagara with supplementary chapter on the other famous cataracts of the world." (Nat., Jan. 4, 1883. 36:32.)

1883 Lespinasse — Lespinasse, R., *ed.* Notes on Niagara. Chicago: R. Lespinasse, 1883.

Quotations from a long list of famous visitors.

1883 — The ice bridge at Niagara. (Harp. w., Feb. 3, 1883. 27:74, 76.)

An illustrated description of the bridge of January, 1883.

1883 — Niagara Falls dry for a day. (Can. nat., Montreal. 1883. 2d ser., 10:63.)

1883 Proctor — Proctor, Richard A. Niagara. (Knowl., Aug. 3, 1883. 4:72–74.)

Account of the death of Captain Webb, impressions of the power and might of Niagara with a quotation from Tyndall.

The scandal at Niagara. (Sat. rev., July 28, 1883. 56:106–107.) **1883**

A comment on the death of Captain Webb and protest against exhibitions similar to his.

Shooting the rapids. (Harp. w., Sept. 15, 1883. 27:584.) **1883**

The trip of the *Maid of the Mist* through the whirlpool.

1884

(Young, David.) The humbugs of Niagara Falls exposed. With a complete tourists' guide, giving hints that will enable the visitors to avoid imposition. Suspension Bridge, N. Y.: (1884). **1884 Young**

Tricks of the hotel managers and hackmen to despoil the visitors are exposed. On pages 16–22 is told "The Experience of John Lauderbauch," a dialect tale of the frauds. "A Traveller's Prayer" on page 22 by John C. Shea asks fitting punishment for the hackmen and guides who molest the visitor.

1885

Parkman, Francis. Historic handbook of the northern tour. Lakes George and Champlain. Niagara, Montreal, Quebec. Bost.: Little, Brown. 1885. Pp. 93–101. **1885 Parkman**

The preface of this book tells us that "These narratives are drawn, with the addition of explanatory passages from 'The Conspiracy of Pontiac,' 'Pioneers of France in the New World,' 'The Jesuits in North America,' 'Count Frontenac,' and 'Montcalm and Wolfe.'" The account of the Falls contains the story of Hennepin's visit and the siege of Fort Niagara.

1887

Gibson, John. Great waterfalls, cataracts, and geysers. Lond.: Thomas Nelson and Sons. 1887. Pp. 16–51. **1887 Gibson**

The author, connected with the natural history department of the Edinborough Museum of Science and Art, describes the Falls at Niagara, the rapids, the best viewpoints, and Goat Island. He also gives some account of its geology, tells of its winter aspect, some of the casualties that have occurred and the feats of daring.

The historical writings of the late Orsamus H. Marshall relating to the early history of the west with an introduction by William S. Stone. Albany: Munsell's Sons. 1887. Pp. 421–425. **1887 Marshall**

Under the captions of "Niagara" and "Niagara Falls" there are almost one hundred twenty references.

1888

1888 The latest foolhardy feat. (Spec., July 17, 1886. 59:950–951.)
A description of Graham's feat and protest against the uselessness of it.

1890

1890 Crowley, *Mrs.* Richard. Echoes from Niagara: historical, political, personal. Buffalo: Moulton. 1890. Pp. 1–19.
Crowley
A flowery description of the Falls.

1890 Niagara Falls. (Buffalo: Mathews, Northrop. 1890.)
Quotations from famous authors, illustrated by photographic views.

1891

1891 Lovett, Richard. United States pictures drawn with pen and pencil. Lond., N. Y., and Chicago. 1891. Pp. 130, 138–144.
Lovett

1893

1893 Bryant, Henry C. Extract from *Century Magazine* for September, 1892, describing an expedition made to the Grand Falls, Labrador. (Ann. rep't of the com'rs of the state reserv. at Niagara. Albany. 1893. 9:81–83.)
Bryant

1895

1895 Bickersteth, M. Extracts from "Japan as we saw it." (Ann. rep't of the com'rs of the state reserv. at Niagara. Albany. 1895. 11:59.)
Bickersteth
A brief description of the view from the Canadian side.

1895 Donohoe, Thomas. The Iroquois and the Jesuits. The story of the labors of Catholic missionaries among these Indians. Buffalo: Catholic Publication Co. 1895. Pp. 32, 207 ff.
Donohoe

1895 Harris, William Richard. The Catholic church in the Niagara peninsula, 1626–1825. Toronto: W. Briggs. 1895. Pp. 123–126.
Harris

1895 Porter, Peter A. Historic Niagara. (Ann. rep't of the com'rs of the state reserv. at Niagara. Albany. 1894. 10:57–71.)
Porter
A reprint from the Niagara book. Among the topics discussed are the various instances of early mention, the derivation of the name, the modern history of the cataract under French, English and American occupation and control; incidents of historical interest, commercial history, the establishment of the State Reservation, Indian lore and later local history.

PORTER, PETER A. The Niagara region in history. (Cass., July, 1895. 8:365–384.) 1895 Porter

1896

DEVOY, JOHN, *comp.* A history of the city of Buffalo and Niagara Falls. . . . Buffalo. 1896. 1896 Devoy

A history of the Falls, the establishment of the reservation, and Niagara power development.

MORRIS, CHARLES. Niagara Falls and the Thousand Islands. (Morris, Charles, *ed.* Half hours of travel at home and abroad. Phila.: Lippincott, 1896. 1:27–31.) 1896 Morris

A rather matter-of-fact account of a tour of the successive points of interest based on a statement made twenty-five years before.

DOLLAR, GEORGE. The Niagara fools. Strand, Sept., 1897. 14: 332–336. 1896 Dollar

An account of daring feats from Sam Patch to date.

1897

Early history of the falls and city. (St. ry. rev., Oct. 1897. 7:634–636.) 1897

Some facts and incidents in the early history of Niagara in popular style.

FRASER, J. MALCOLM. Niagara in winter. (Pearson's mag., Dec. 1897. 4:599.) 1897 Fraser

An illustrated description of the interesting features at Niagara, of which the author says "Niagara in summer is superb; in winter is awe-inspiring."

1898

JOHNSON, RICHARD L. Niagara: its history, incidents, and poetry. Wash.: Walter Neale. 1898. 1898 Johnson

Most artistically arranged, and beautifully illustrated. Among other views is a reproduction in color of Church's *Niagara*. The halftones are from original photographs by some of the best known artists in America and faultlessly reproduced. The history of the cataract and park is told in charming style, and the volume contains most, if not all, of the best poetry inspired by the Falls. In addition to all this there are an interesting guide, showing how to see Niagara aright, and a list of the principal hotels.

1898 Sulte — SULTE, BENJAMIN. The valley of the Grand river, 1600–1650. (Royal Society of Canada, proc. and trans., May, 1898. 2d ser. 4:109.)

1898 Waldron — WALDRON, HOLMAN D. With pen and camera at Niagara Falls; text by H. D. Waldron. Portland, Me.: Chisholm. 1898.

1899

1899 Beers — BEERS, J. H. History of the Great Lakes. Chicago: Beers. 1899. 1:27–32.

Quotations from Hennepin, Trollope, Bryant, Hawthorne, N. P. Willis, Arnold, Garfield, and Dickens.

1899 Dunlap — DUNLAP, ORRIN E. Ice bridge in the Niagara gorge. (Eng. news, Feb. 9, 1899. 41:82.)

The Grand Trunk bridge was threatened and the lives of three persons endangered by what was considered the greatest ice bridge Niagara had had in many years.

1899 — History of the Great Lakes. Chicago: Beers. 1899. Vol. 1. See index.

An account, historical, geological, and anecdotal, together with quotations from various authors.

1899 Misner — MISNER, CHARLES E. My experience on the great ice bridge in the gorge of the Niagara river at Niagara Falls, January 22, 1899. (Home mag., Mar., 1899. 12:239–242.)

On Sunday, January 22, 1899, my friend, Miss Bessie Hall, and myself decided to visit Niagara Falls and cross, if possible, over the ice bridge. We found perhaps fifteen persons on the ice. I was very anxious to cross, but here Miss Hall faltered. After a little persuasion she agreed to follow. So we started; little did we know how we should return.

The ice at this point, towering as high as thirty and forty feet, was very rough, then again we would come to patches probably fifty feet long where the ice would range from the size of a tea-cup to pieces twenty-five feet in diameter. There was no path cut in the ice as the bridge had only formed a day or two before. Over this jagged ice we picked our way to perhaps 200 yards from the boat landing. Here we sat down on a large boulder

of ice. It was a grand scene and we sat there nearly half an hour. By this time many of the others had returned to shore and we found we were left alone. I felt perfectly safe, but Miss Hall remarked she could hear a singing noise under her feet. I assured her it was only her fancy. 1899 Misner

Feeling we had seen all that could be seen we started back toward the American shore. We had not gone far when we were told by gestures that a landing at the boat dock was impossible, as the ice had broken away, leaving a crevice which was too large to cross. We were told to go down further toward the arch bridge, where we could land in safety. I was not a bit afraid yet, but felt that when I was safe on land I would be thankful. I said nothing to Miss Hall, as she was naturally already a little alarmed. The traveling was very difficult as the ice was very rough. There were a good many people along the banks and on the bridge watching us, as we seemed, and were, in rather a dangerous position. By this time I began to be pretty well alarmed myself. Every minute or two we could hear a noise as if something were falling. We were now perhaps seventy-five yards from the steel arch bridge and about fifty feet from the American shore. Ranging along close to the American shore was a huge boulder of ice upon which were about seven or eight men.

So it was when the terrible crash came. We were hurrying as fast as possible and had just come to a large crevice in the ice about three feet across, which I tried to bridge over with pieces of ice so as to be able to help Miss Hall across. By looking into this crevice you could see the black water a hundred feet below. One false step meant sure death. It was now about 4.10 P. M. There had been probably 200 people watching our progress and in less than three minutes afterwards there were 2,000.

I was just getting ready to jump across this crevice when there was a loud report, a grinding sound and we realized that the ice bridge had begun to move. The falling of huge masses of ice, the grinding, gurgling sound that reached our ears nearly

1899
Misner

paralyzed us with fear. I was undecided at first as to the best course to take, but on finding ourselves entirely cut off from the American shore, our only escape was to head toward the Canadian side. Taking Miss Hall by the hand I started to make for a place of safety. We had perhaps gone a yard or so when the ice parted at our very feet and but for my having hold of Miss Hall's hand she would have gone to the bottom or have been ground to death by the ice before reaching the water. She fell her full length between these two boulders, but by putting forth every bit of strength I could I managed to pull her out, but none too soon, for the ice came together with an awful crash.

We were now about seventy-five or one hundred yards below the steel arch bridge, having been carried about one hundred and fifty or two hundred yards on the ice. Close to the steel bridge on the American side is the tunnel through which the water used in the power station above the Falls emerges at the rate of eighty-five miles an hour. Here was the point where death seemed so certain. Old settlers of Niagara Falls little expected us to get by this point, as the undercurrent here usually sucks under anything that passes. But we passed this in safety and when a few yards below we heard a shout and found that the ice bridge had come to a standstill! It was the first time in the memory of man that the bridge was ever known to stop after once starting down the river!

Now we realized we had to act and act quickly. Every second meant life or death. Shouts went up from the thousands on shore for us to hurry. The bridge was liable to start again at any moment. We headed straight for the Canadian bank. Men shouted to keep down the river farther. Taking Miss Hall by the arm we made haste to reach land. Falling down but quickly jumping up we would again push onward. Once Miss Hall gave up entirely, but I succeeded in urging her onward. It was very difficult for us to run over this expanse of ice (about 200 or 300 yards across) and mostly huge boulders thirty feet high. Again it would be necessary for us to jump five and ten feet into

ravines, not knowing where we were going. The ice was liable to break up at any moment. From our position we could see the thousands who were watching us and could hear the encouraging shouts as we neared the Canadian shore. It was necessary for me to leave Miss Hall at times in order to determine our best course. 1899 Misner

After crossing about fifty yards of the slush ice we reached the Canadian shore, after being about forty-five minutes on the ice bridge struggling for our lives. There willing hands stood waiting to receive us and to congratulate us on our almost miraculous escape from certain death.

PORTER, PETER A. Champlain not Cartier made the first reference to Niagara Falls in literature. Niagara Falls. 1899. 1899 Porter

ATKINS, BARTON. The river Niagara: descriptive and historical. Pan-American ed. Buffalo. 1899. 1899 Atkins

1900

DUNLAP, ORRIN E. Niagara in winter. (Cosmop., Apr., 1900. 28:593–604.) 1900 Dunlap

An account of Niagara as a winter resort together with a description of the wonderful ice formations there.

When zero has prevailed for days; when the wind has been shifting, now blowing the spray-cloud this way, now that way, touching everything all about as though by liquid marble which hardened as it fell, then is the time to visit Niagara if you wish to dwell in a fairyland where the Ice-King reigns in all his glory. The familiar rocks, the familiar shrubs, the familiar trees, have all disappeared, and in their place there is a forest and setting of purest marble.

The proper conditions for Niagara ice-bridge formations are then at hand also. Weeks of severe cold weather result in the formation of large bodies of ice in Lake Erie. Then comes a thaw to rot the ice, followed by a high wind from the west to break it and sweep it down the lake to the entrance to the Niagara.

1900
Dunlap

Once it is in the grasp of the river, the current hurries it on toward the falls with rapid pace. On the occasions of large floes the ice gathers in considerable quantities on the reefs and bars above the falls, in many cases diverting the direction of the current, and making it possible to cross on the ice to points seldom reached.

The most wonderful incident of this kind on record occurred on March 29, 1848. The winter had been very cold, and the ice in Lake Erie was exceedingly thick. The warm days of approaching spring weakened it, and during the day a heavy wind started the ice-field in motion. It was swept into the river entrance in such immense quantities that it filled the outlet of the lake to such an extent that the flow of the water was impeded. In the morning the people at Niagara Falls found their river was half gone. Only a creeklike stream flowed through the American channel, and the water in the Canadian, or deeper, channel had also dwindled away, so far as water was concerned. The rocky bed of the river was bare. Niagara's roar was gone. During the day the ice-dam at the river's entrance near Buffalo gave way, and the torrent again plunged over Niagara.

The ice as it leaves Lake Erie sweeps down the river in a mass that whitens the river from shore to shore, making a spectacle well worth watching from the trains of the several railways running between Buffalo and the falls along the river-bank. The trip of the ice through the upper rapids and over the falls breaks the mass into small, uneven pieces, few of which, strange as it may seem, are as large as a peck measure. And stranger still it is that these small pieces of ice find it possible to jam on such a current as that of the Niagara River below the falls and form an ice-bridge of such remarkable strength as some of these structures prove to possess. No feature is so interesting as the formation of a Niagara ice-bridge. Hour after hour the ice tumbles over the American and the Horseshoe Falls. Gradually the eddies in the lower river become filled, and the ice in them extends out to the main current. When this stage of forma-

tion has been reached, the ice coming downstream is passing through a channel in the center of the stream. It may flow on for hours in this way, the ice in the eddies still, and gradually being added to from the moving mass in the center. The size of the floe increases; the channel in midstream is not large enough to carry the ice downstream. There comes a jam, the ice stops in its headway. A grinding, pushing, crowding noise comes up from the gorge. An ice-bridge is forming. It is fast. There it is breaking away at the lower end, while some of the ice at the upper end is being swept beneath the quiet portion. It is moving. The ice in the center is again going downstream. This may continue for hours longer until another great mass of ice comes over the falls. It fills the channel and piles up so that it is evident that it is firmly wedged. The ice already in the upper river and that at the lower section of the lake continue to pour down over the falls for days. The wind changes. The water, which has been quite high, lowers; the icy mass in the gorge settles and wedges itself more firmly between the shores. Great cracks open here and there on the surface of the jam. The experienced eye says, "It is safe," and out from either shore plunge venturesome people anxious to be the first to cross. 1900 Dunlap

This first crossing of a Niagara ice-bridge is desperately dangerous business. The ground, if so it may be termed, is uncertain. Before starting out from the shore the adventurers take a survey of the surface of the bridge, deciding to avoid this or that fissure or crevasse, to accomplish which they frequently have to take a roundabout course. The longer they are on the ice, the longer they are in danger. They all aim to be fleet of foot, but the surface is most uneven. Smoothness is unknown in a Niagara ice-bridge. The trip across is simply uphill and downhill. The icy hillocks form an uncertain footing. There is many a tumble in the early trips, and when one falls at such times he wonders where he is going. At times the route selected leads high up on an icy mound, and then down between the walls of a crevasse from which even the high banks are not to be

1900
Dunlap

seen. It is every man for himself during the first trip, for it couldn't well be otherwise. It is a wild scramble, and there are always many spectators on the cliffs to watch the success of the several aspirants for fame. Women, as well as men, endanger their lives at this stage of the ice-bridge, and the names of the leaders in crossing are usually heralded through the press, while they also make an interesting record in the ice-bridge history. Nothing in the world makes such a wonderful demonstration of the power of small things when united, as do these Niagara ice-bridges. At the point where the jams occur, the river is about one thousand two hundred to one thousand five hundred feet across, and the water in the channel has a depth of about one hundred and ninety-four feet. Back of this water there is ever the force of the falling water of the cataract, over which it is estimated that fifteen million cubic feet of water pass every minute. It is this stream, this current, this force of water, that these small particles of ice-bridge span so firmly that thousands of people cross from shore to shore on the mass, and even horses have been known to cross and climb the ice-mound. Horses that have made this trip have been brought down the path on the Canadian side of the river and led across the ice-bridge and up the mound, owing to the fact that there is no path to descend the cliff on the American side of the river.

During the period of their existence the ice-bridges undergo wonderful changes. In the early stages the changes are frequent. Very often the first bridge lasts but a few days, but if the ice-bridge season is on, another bridge quickly takes its place. After a substantial bridge has formed and there comes a heavy floe of ice, the bridge is usually greatly strengthened. The new ice lodges against the upper line of the bridge, frequently building it away up to the foot of the Horseshoe or Canadian Fall. The water in the lower river rises, and the loose ice is swept over and on top of the bridge, changing its formation entirely, and building a structure that will last for weeks despite weather-changes. When this condition is reached,

the hearts of the Niagara hotel proprietor, the bazaar man and the guide thump with joy. The season is then at its height. Excursionists number thousands upon thousands, all crowding to Niagara, by steam-roads and by trolley-lines, all eager to see the winter spectacle. By this time the residents on both sides of the river have worn a good pathway across the bridge from shore to shore. Men of the hour, or men of opportunity, erect "shanties," sometimes dignified by the name of "hotels," on the bridge along the path. These buildings are a wonder. They spring up in a day, in an hour, in fact. Their only foundation is the ice, and each one has nearly two hundred feet of water in the "cellar." Variety is the spice of ice-bridge life, and here and there is to be seen an Indian tepee. Squatter sovereignty prevails. In the matter of location it is first come, first served, and to get there means ownership of the site. Right in midstream, as near as the eye can judge, shanties crowd each other, and in these places liquors are frequently served. A few days of this seldom excites comment, but after the bridge has been in existence many days and has become well advertised, there is a change in the composition of the class of visitors. People who might have overlooked the sale of liquors at the start now criticise it. This develops a public sentiment, and the officials on each side act. Arrests are made, but the boundary line is always disputed, no matter on which side the culprits are held, and as the ice-bridge has passed away by the time the trial is heard, convictions are hard to obtain. In fact, with the possibility of repeating the offense removed, public sentiment has always, at this stage, been lenient. 1900 Dunlap

With the bridge firmly established, the shanties in place and the people pouring into Niagara, a glorious winter festival is opened. From shore to shore across the icy mass the people wend their way by thousands, a black, serpentlike moving mass of humanity, bending in and out, up and down the grandly uneven mass. They go and they come, a jolly, boisterous, laughing lot of people, the circulation of their blood stirred by their

1900
Dunlap

activity and outing, and the circulation of their finances increased by the smooth words of the tin-type man, the bazaar man and the coffee and sandwich, of the wiener, vender. Ladies rich in furs eat sausage with a relish on the ice-bridge, for tramping about the formation creates a startling appetite. During the ice-bridge season, Sunday is the heaviest day at Niagara, and on such occasions the cliffs echo and reëcho with the hilarity of the visitors. The free parks on both sides of the river are black with humanity, and the wonder is that some lives are not crushed out in the throng. Here and there about the ice-bridge little knots of people may be seen. They represent that class of individual who is determined to do something different from thc multitude. They are explorers bent on planting a tree or bush on some hitherto unreached point. A flag will float from the top, and cheer on cheer will denote the success of the venture. Others will explore the deep crevasses, taking soundings to determine, if they can, how thick the ice is at this or that spot. This matter of thickness is an interesting study, and men of considerable ability like to know the result of these investigations. It is usually estimated that about one-third of a body of ice remains above the surface of the water. In many instances the crevasses of the Niagara ice-bridges are all of thirty or forty feet deep, and on the basis referred to the thickness of the body of ice would be nearly one hundred feet. This is not given as an accurate statement of the thickness of the ice, for this question of thickness is a hard matter to ascertain with any degree of accuracy. However, if the ice has a thickness of thirty feet above the river's surface, it is a safe conclusion that there is a considerable depth below the water.

The winter of 1899 brought a most wonderful ice-bridge to Niagara. The formation was massive. Its power was threatening. The abutments of the upper steel-arch bridge, the greatest all-metal arch in the world, are located close to the water's edge, right where the ice-bridges form. The ice gathered about these

abutments to a height of eighty feet, extending away up into the steel work of the arch, pieces of which were bent. So immense was the jam of ice that gangs of men were set to work on both sides of the river blasting the ice from about the abutments in order that those structures might not suffer. The men who did this work found that the ice was many feet thick below the water-level. They also found that, owing to the strange formation of the ice-bridge, the operation of blasting had to be repeated several times. During the last summer the abutments of the arch have had protective walls built about them to assure their safety in times of similar ice-jams. 1900 Dunlap

There is no little gratification in the thought that the forming of an ice-jam at Niagara does not necessarily mean the loss of life and the destruction of homes and other property. On the Niagara River from the point of formation to Lake Ontario, the banks are sufficiently high to prevent a flood and to conduct the ice and water safely to the lake. But some of the ice-bridges at the falls have wrought damage. It was on January 15th that the first bridge of 1883 formed, and on January 22d the second bridge came. With the coming of this second bridge in 1883 there was a great rush of ice. The water in the lower river was very high and about one hundred feet of the inclined railway building was carried away. At that time in order to reach the surface of the ice-bridge it was found necessary to excavate a tunnel eight feet high, fifteen feet wide and twenty-five feet long through the ice. Naturally, this tunnel added to the interest of a visit, and the wrecking of the incline building excited the curiosity of thousands. The bridge lasted thirteen weeks, and the crowds were tremendous. The night the bridge formed, a house on the Canadian side of the river, near the water's edge, and occupied by John McCloy and family, was carried from its foundations and tipped over.

No matter how far up toward the Horseshoe Fall a bridge may form in its early stages, it usually breaks away until its upper line is straight with the lower edge of the American Fall, but great masses of ice hold fast to either shore above that point.

1900
Dunlap

The formations frequently extend down the river close to the whirlpool rapids, and many crossings have been made below the old "Maid of the Mist" landing. On the Niagara River between Lewiston and Fort Niagara teams have freqeuntly been driven across the ice-bridges, and old residents recall that they have seen the river from the whirlpool to the mouth jammed with ice of wonderful shapes. Frequently when an ice-bridge is forming and the water is high, huge timbers are swept from points on the upper river and carried over the falls. Occasionally these timbers lodge in the ice-bridge, and when viewed from certain points appear to stand high above the cliffs. In some places on the ice-bridge, the mass forms like a congealed tidal wave, appearing like a great roll. To get down into a crevasse and peek through the ice at the falls is a novel experience and well worth the trouble. When the bridge first forms, all the little pieces of ice are plainly to be seen. However, after a snowfall an indescribable softness is given to the scene. The snow fills in about the icy hillocks. It clings to the sides of the mountainous formations, the solid ice of the chunks peeking through here and there, now one color, now another.

Of all the thrilling experiences on the Niagara ice-bridges, none equals that of the people who were on the ice on the afternoon of Sunday, January 22, 1899. That afternoon soon after four o'clock, the people who had gathered in the free parks and on the upper steel arch to view the winter spectacle were startled to notice that the icy mass had broken loose and was being carried downstream toward the whirlpool rapids by the current. On the ice-bridge at the time were from fifty to one hundred persons, some of them having ventured out only a short distance from shore, while others were well out in the center. There was prospect of a terrible river catastrophe, and the thousands of spectators stood aghast. At the first trembling of the ice, the people on the ice-bridge increased their efforts to reach the shore. The journey of pleasure had now turned into a race for life. Across the upheaving, moving mass of ice they ran, their feet hardly touching the surface in their progress. Down the river the ice

continued to move. The excitement lessened slightly when it was apparent that all but three persons had reached places of safety. These three were a man and a woman out toward the center, who were making for Canada, and a young man who attempted to reach the American shore. This young man displayed wonderful coolness. He had approached as close to the shore as the moving ice would allow and then he turned his face downstream. It was evident that he must change his route. Some began to think he was lost. He faced the upper steel-arch bridge. The crowd on the banks immediately got his idea of safety and cheered him for his nerve. Up against the abutments of the bridge, the ice was crowding mountains high. There was an element of great danger in this turmoil of ice, but the young man kept his head. Straight up he stood. The ice moved along. If he passed under the bridge, he would certainly lose his life in the wash of the stream that poured out from the power tunnel. It was a moment of intense excitement. He must catch the bridge or die. 1900 Dunlap

Up from the abutments, in most graceful form, the main span of the arch rises. It seemed almost impossible for him to grasp the bridge from where he stood, but fortune favored him. At the critical moment there was a mightly upheaval of ice. He was fairly lifted from the ice-bridge and thrown upon the arch, to which he clung with desperate tenacity until sufficiently composed, after which he made his way along the girders to the shore, cheered by all who were about. In the mean time the man and woman farther out on the ice had been making terrific efforts to reach the shore.

The course they took was full of peril. It led them nearly the entire length across the ice-bridge. When they started they were nearer the American shore, but it was evident that they were frightened by the ice piling up there. They had selected the route they took because of its apparent smoothness, but it was terribly rough at its best, as they found in their flight. The man led the way, in order to pick safe footholds. Repeatedly the woman was seen to fall. Her companion hurried on at times in

1900 Dunlap

his efforts to set a pace to encourage her and hurry her on. Once the crowds felt that he was deserting her. Time and again, however, he turned and helped her to her feet and prayed her to keep up courage. He did all that man could do for a fair companion, and when the people recognized his devotion to her, and that both would be saved or both die, they breathed silent prayers that their lives might be spared.

Finally, they were seen to reach the still ice in an eddy on the Canadian side and from this point men who had hurried down the bank aided them to shore. They had been carried over two thousand feet downstream on the moving ice, which seemed every moment as about to open out in a great crevasse beneath them. The lady was Miss Bessie Hall, of Johnsonburg, Pennsylvania, while her companion was C. E. Misner, of Buffalo. No lives have ever been lost on the Niagara ice-bridges.

1900 Porter

PORTER, PETER A. Goat Island. (Ann. rep't of the com'rs of the state reserv. at Niagara. Albany. 1900. 16:75–128.)

Mr. Porter's purpose is best expressed in his own words. "I have endeavored, in this article," he says, "to bring together a number of opinions that have been expressed about Goat Island, in its various aspects. These expressions are mainly those of persons to whom the world has given a hearing, because of their abilities and prominence in their respective spheres. And joined to, and interwoven with these expressions, I have added such a chronology of the island as I have been able to collect." The geology, botany, history, literature, and natural beauty of the island is each considered in its turn.

1900 Stonebridge

STONEBRIDGE, G. E. Through Niagara whirlpool rapids in a boat. (Sci. Am., July 28, 1900. 83:59.)

An account of the trip of Peter Nissen, the first man to go through the whirlpool rapids in an open boat unharmed.

1901

1901 Dunlap

DUNLAP, ORRIN E. Foolhardy attempts at passing the whirlpool rapids of Niagara. (Sci. Am., Sept. 28, 1901. 85:201–202.)

1901 Sulte

SULTE, BENJAMIN. Le Fort de Frontenac, 1668–1678. (Royal Soc. of Can., proc. and trans., May, 1901. 2d ser., sec. 1.7:95–96.)

1902

DUNLAP, ORRIN E. Niagara and its notoriety-seekers. (Cosmop., Mar. 1902. 32:333–335.) 1902 Dunlap

A detailed account of the various rope-walkers, barrel-fiends, and swimmers who have sought notoriety at Niagara.

DUNLAP, ORRIN E. Niagara—the scene of perilous feats. (Cosmop., Feb. 1902. 32:358–370.) 1902 Dunlap

Niagara stands unrivalled the world over as the scene of the most daring feats known. In all cases the motive prompting those who so wantonly risked and often met death has been a desire either for money or for notoriety.

It was the late Sam Patch who first traveled to Niagara to perform an unusual feat and thereby win fame and fortune. He worked in a mill just above Pawtucket Falls, Rhode Island. There he used to bathe with his companions and engage in high jumping. They dove down from a bridge into a deep pool, and not satisfied with this, they sought greater heights and leaped from the roof of the mill near by. It was here that Sam Patch developed his ambition and ability. An early business venture failing, he began accepting engagements about the country to jump from high places. In September, 1829, he found himself one of a big crowd attracted to Niagara Falls to witness the sending over the cataract of the condemned brig "Michigan," cruelly loaded with terror-stricken wild animals. Sam Patch was inspired to profit by the excitement that prevailed, and accordingly, he built a wooden tower, ninety feet high, at the water's edge at the foot of the Biddle Stairway on Goat Island. From a platform on top of this structure he leaped safely into the waters of the lower Niagara River. His career closed soon afterward, however, with a leap in Rochester which cost him his life.

Thirty years after, Monsieur Blondin, a Frenchman, appeared at Niagara with his business agent, Harry Colcord, and announced his intention of crossing the gorge on a tight rope

1902
Dunlap

stretched from Goat Island to the Canadian bank. At first the press viewed the plan with suspicion, but Blondin soon gained the popular confidence by daily walking up and down the guys of the old railway suspension-bridge, carelessly puffing at a cigar. In June, 1859, he stretched his rope midway between the falls and Whirlpool Rapids, at a place known as White's Pleasure Grounds. A seven-eighths-inch rope was first carried across the gorge, and when the cable arrived, on June 22, 1859, all was in readiness to place it. This cable was about one thousand three hundred feet long, and with it came fully thirty thousand feet of rope for guys. On June 23d, when the big cable had been drawn to within two hundred feet of the Canadian bank, it was feared that the small rope first stretched would not be strong enough to land it; but to the astonishment of all, Blondin tied a rope to his body and walked out on the small rope and attached another rope to the cable. Each day it seemed as though Blondin became more fearless, and the news of his doings greatly excited the locality.

It was arranged that Blondin's first public performance should be given on June 30, 1859. Previous to the river trip on the cable, he gave a performance on a rope in the Pleasure Grounds. He danced, turned over and over, leaped backward ten to fifteen feet, and bounded high in air, showing astonishing skill.

It was about five o'clock in the afternoon when he started out on the cable from the American side. When about one hundred feet out he sat down, lay on his back, stood on one foot, and then resumed his journey. At intervals of about one hundred and fifty feet he repeated this performance, until he reached the middle of the river. Then the steamer " Maid of the Mist " came up the river, her flags flying and loaded down with passengers. Blondin dropped a cord to the deck and pulled up a bottle, from which he took a long draft. He then leaped to his feet without touching his hands to the cable, and continued his walk to the Canadian cliff. He was on the rope eighteen minutes, and as he landed the gorge rang with cheers. In half an hour he returned across the

rope to the American side in seven minutes, including a stop in the center to view the falls. The balance-pole he carried was about thirty-eight feet long and weighed forty-five pounds. While an admission-fee was charged to the Pleasure Ground, Blondin's principal source of compensation was through collections taken up among the crowds on the river bank. His first trip was witnessed by thousands of people who had traveled long distances to see him. 1902 Dunlap

Blondin's second performance was given on July 4th of the same year in the presence of a still larger crowd, and this time he walked with a sack over his head and body, his legs and feet being free. On July 14, 1859, the Hon. Millard Fillmore witnessed his performance. On this occasion Blondin stopped in the center of the cable, and at a signal from the steamer " Maid of the Mist " in the river below, he held out his hat, and Captain Travis, a famous pistol-shot, sent a bullet through the rim of it, after which the hat was lowered to the steamer's deck. After crossing to Canada, Blondin returned, dressed as a monkey, and trundled a wheelbarrow over the rope. On Wednesday, August 3, 1859, Blondin, before the largest crowd of that year, made a trip over the rope in less than six minutes, taking time to stand on his head. On his fifth trip Blondin carried Harry Colcord on his back. Colcord weighed one hundred and forty-five pounds, and that portion of the trip over the center where there were no guys was especially thrilling. On landing, both Blondin and Colcord were carried on the shoulders of the crowd to a carriage. On August 31, 1859, Blondin gave his first night performance. At each end of the rope locomotive headlights were placed to give illumination. On his pole he carried colored lights, and when in the center these lights gave out, leaving him in darkness. Those close by the cable felt for the vibration, which told them he was safe as they felt his careful tread. Blondin closed the season by crossing with baskets on his feet and shackles on his body. On returning from Canada he carried a table and a chair. When a third of the way across, he attempted to seat him-

1902
Dunlap

self on the chair, but it slipped and tumbled into the river. Blondin, however, recovered his balance and regaled himself with champagne and cake while sitting on the rope.

Blondin's fame was now so well established that everybody was eager to see him. The townspeople of Niagara liked his performances because they attracted crowds, filled the hotels and helped trade. In 1860 Blondin stretched his rope across the gorge below the railway suspension-bridges, right over the Whirlpool Rapids. This was in the village of Niagara City and the Niagara Falls people were quite angry, for in those days there was no little jealousy between the rival villages, which have since been merged into cityhood. Accordingly he returned the following year, and his first feat was crossing the rope backward. Next he walked blindfolded. On July 4th he performed on a rope suspended from his cable. On September 8th, the presence of the Prince of Wales, now King Edward, inspired his greatest daring and he carried Colcord across on his back and also walked over on stilts.

While the name of Blondin will ever be associated with the Niagara gorge, many others have sought fame there in the performance of feats equally brilliant. But his was the first success, and it is well known that the world never gives as much appreciation to those who follow. Even while Blondin was drawing crowds in Niagara City in 1860, he was confronted by a rival named Signor Farini, who stretched his rope across the gorge near the outlet of the hydraulic canal. While Blondin walked on a tight rope, people were amazed at Farini, who always had his rope very slack. Farini gave many performances, and he aimed to surpass Blondin, walking with his feet in a sack, while Blondin had left his free. On August 29, 1860, Farini carried Rowland McMullen over the cable on his back, but Colcord lives where McMullen is forgotten. On September 5th Farini while on the cable washed ladies' handkerchiefs in water drawn up from the river far below.

On August 6, 1888, Blondin revisited Niagara, the place that made him famous. In the years he had been abroad, others had sought to do what he had done. In July and August, 1865, Harry Leslie, styled "the American Blondin," crossed the gorge on a cable over the rapids. In August, 1873, Signor Balleni stretched a cable from Prospect Park to a point on the Canadian side, and made his first crossing on August 25, 1873. Balleni embellished his performance by dropping from the cable to the river by means of a rubber rope, and one day while fastening his balance-pole preparatory to this leap, he lost it in the river, but managed with difficulty to reach land again. 1902 Dunlap

On Saturday afternoon, July 8, 1876, Signorina Maria Spelterina crossed the Niagara gorge on a two-and-one-fourth-inch rope stretched over the rapids below the railway suspension-bridge. She is the only woman who has the credit of such a performance. Her crossing with baskets on her feet was startling, and she also walked with ankles and wrists manacled. In those days Niagara was far more popular with Southerners than it is to-day, and the Southern society that gathered there set the pace for all pleasures and encouraged the performance of these hair-raising feats.

Among those who had helped Signor Balleni erect his cable in 1873 was a painter named Steve Peere, who lived in Drummondville, Ontario. One day Peere secured Balleni's pole and fearlessly ran out on the cable. The jealousy of Balleni was aroused to such a pitch that he was caught in the act of trying to cut the cable. One strand had already been severed, and a couple of strokes would have sent Peere to instant death. This incident closed Balleni's career at Niagara. Peere, however, was destined to make his mark, for a few years later he crossed the gorge on a cable only three-quarters of an inch in diameter, a mere thread compared with the rope that Blondin and others had used. Then, too, its surface was hard and slippery. Three days after this feat Peere was found dead on the river bank under the Canadian end of the cable, and it has always been

1902
Dunlap

supposed that he had tried to walk the cable at night, with his boots on, while intoxicated.

Not discouraged by Peere's fate, Samuel John Dixon, of Toronto, made two trips across the same narrow path of steel.

Clifford M. Calverley, James E. Hardy and J. F. Jenkins have also crossings of the gorge to their credit. Hardy is said to have been the youngest man to perform the feat; while Jenkins crossed on a velocipede arrangement, his balance-pole being carried under his feet.

It is hard to tell whether those who have done wonderful things in the air or those who have sought fame in the water have created the greater sensation at Niagara. It is not recorded that anybody has ever lost his life walking across the gorge on a rope or wire, for Peere's death was more in the nature of a tumble from the cliff, but many lives have been lost in braving the tumultuous waters of the cañon of Niagara. The lower Niagara River was generally believed to be unnavigable between the Falls and Lewiston until 1861. The steamer "Maid of the Mist" was then heavily mortgaged, and Captain Robinson reckoned he wasn't going to have her tied up, if running her to a Canadian port could avert it. Accordingly, on the afternoon of June 6th, with only his two associates MacIntyre and Jones aboard, Robinson gave the signal to go ahead, but to the surprise of those who saw the boat her bow was directed right toward the rapids instead of toward the falls. Under full steam the little steamer sped down the river and dashed into the waves. She plunged through the rolling whitecaps with a rush, but lost her smokestack as the huge waves swept her deck. The voyage was fierce, but short, and in a few minutes the boat was in the whirlpool. She answered to her rudder, and turning her nose out of the outlet, Robinson soon had her speeding toward the peaceful waters five miles below. Practically uninjured, the boat landed at the wharf at Queenston, and Robinson was a hero.

Nearly a quarter of a century passed before a human being again voluntarily defied the fury of the Whirlpool Rapids, and

From Amérique Septentrionale — État de New York

HORSE SHOE OF NIAGARA FROM THE CANADIAN SIDE

From a Lithograph of a sketch by J. Milbert, 1818

when this time came, the waters dashed his life out as though angered at the victory that Robinson had won. In 1883 Capt. Matthew Webb, a famous English swimmer, left his home and crossed the ocean to battle with the powerful currents in the Niagara gorge. It was generally believed that when Webb reached Niagara and viewed the rapids, he would reconsider his determination. But he did not lose confidence, and on July 24, 1883, he entered a small boat, with Jack McCloy at the oars, and started down the river. When yet several hundred feet from the rapids, he leaped from the boat, and with nothing on but a pair of red trunks, swam with all his skill into the foaming waters. Thousands were on the cliff-tops and bridges. As Webb passed under the suspension-bridge, he swam with much grace and beauty. Right into the crested waves he was hurled as the force of his own strong strokes and the current sent him forward. He was seen to pass a few of the swells, and then he was sucked under by a mighty wave. Four days later his lifeless body was picked up seven miles down the river, and to-day it rests in a grave in Oakwood Cemetery. Webb's mistake was in failing to recognize that even if he could have battled with the swirling currents, the air-charged waters of the gorge and rapids lacked the buoyancy necessary to support him. 1902 Dunlap

The fate that befell Webb, instead of discouraging others, inspired them to emulation. Among those who aspired to make the trip was Carlisle D. Graham, a Philadelphia cooper. Many jokes were cracked at Graham's expense when in 1886 he announced that he would make a barrel in which he would go through the rapids. In due time Graham, true to his word, appeared at Niagara with a barrel in which he could stand, so weighted that it would float nearly upright. Not only did he go through the Whirlpool Rapids, but he was swept through the entire gorge to Lewiston, the trip occupying thirty-five minutes. Then he announced that on his next trip he would have his head out of the top of the barrel in full view of the people. This venture left him very little hearing, for a big wave gave him a deafen-

1902
Dunlap

ing slap on the side of the head. Graham made a third and a fourth trip that summer, and then for twelve years he prudently rested on his laurels, watching all that was done in a sensational way at Niagara. Last summer scored his fifth trip through the rapids, and nearly ended his life, for he was caught in an eddy, where he was held over twenty minutes. The day was very warm, and when Graham finally reached the whirlpool and was taken from the barrel he was nearly suffocated.

The first double trip through the rapids was made by George Hazlett and William Potts, of Buffalo, in 1886. In the same year W. J. Kendall, a Boston policeman, swam through the rapids to the whirlpool, protected only by a life-preserver.

Up to this time the thirst for notoriety in the rapids had been confined wholly to the sterner sex, but in the late fall of 1886 Miss Sadie Allen, in company with George Hazlett, made a barrel trip through the rapids.

For over fourteen years after this there was a cessation of barrel trips, and in the mean time men who had ideas about life-saving boats came to the front. Charles A. Percy, of Niagara Falls, was the first. His boat was seventeen feet long and had a beam of four feet ten inches. At each end there was an air-chamber, and ensconced in one of these air-chambers Percy made three trips through the rapids in 1887, on one of which he was accompanied by William Dittrick. His last voyage was very rough and he lost his boat.

The next man to bring a boat to Niagara was Robert William Flack, of Syracuse. He surrounded his craft, the "Phantom," with mystery. It had a filling, he said, that he expected to patent, and he was confident that it would prove a great money-maker. Flack early met Percy, and the two entered into an agreement to have a race through the gorge in the boats they had made. But as Percy had been through the rapids and inspired confidence in his boat — this was following his first trip — Flack must first inspire equal confidence in his boat by making the voyage. July 4, 1888, was the date selected. Flack's craft was

very light and those who knew the rapids had their misgivings, but nothing could alter his determination. From the same hotel left by Webb on the day he went to death, Flack walked to the river. In order that he might not fall out should the boat capsize, a harness had been adjusted about his waist. With bold, strong strokes he pulled out into the current and headed straight into the rapids. The waves tossed the boat as though it were a shell, and it was capsized three times in the trip. Never has a crowd that assembled on the Niagara cliffs witnessed such a fearful tragedy. As the boat was about to enter the whirlpool, it was raised high in the air by a huge wave and then dashed down bottom-side up. Poor Flack was beneath it, and for over an hour this boat, designed to save the lives of others, floated there, rolling and whirling about in the great river pocket. Percy, witnessing the tragedy from the American side, jumped into a buggy and drove to the whirlpool on the Canadian side, where, throwing off his clothing, he leaped into the river and swam for the boat, which was now approaching the shore. When it was righted, the lifeless body of Flack was taken from the harness rigging. The secret filling was excelsior and shavings.

1902 Dunlap

The next year Walter G. Campbell appeared at the falls with an open flat-bottomed boat, which he launched above the rapids. His only companion was a black dog. He stood up, using his oar as a paddle, and boldly drifted with increasing speed toward the seething pool. Fortunately, the boat capsized before the worst water was reached, and with a life-preserver around his waist, Campbell just managed to struggle to the shore, but the dog paid the penalty of his master's folly.

For ten years the appetite for notoriety in the waters of the Niagara slumbered. The peace was unbroken until Peter Nissen, known only as "Bowser," came to the falls from Chicago. He announced that he was on a vacation, during which he intended to amuse himself by going through the rapids in a boat he brought with him. With the exception of a cockpit in the center, it was decked over. There were air compartments at

1902
Dunlap

each end and also at the sides of the cockpit. A new feature in rapids navigation was that to the keel there was fastened by iron straps an iron keel that weighed one thousand two hundred and fifty pounds. He intended to establish a boat service through the rapids, he said. On July 9, 1900, Nissen made one of the prettiest rapids trips ever seen. It was after four o'clock when the "Fool Killer" appeared on the river in tow of a rowboat. After being cast adrift, it was caught in an eddy on the Canadian side and had to be started again. It was close to five o'clock when the boat finally entered the rapids. It rode the waves magnificently. Frequently the foaming waters dashed clear over it, but it did not capsize. Reaching the whirlpool, Nissen floated for an hour before his boat was caught by men from the shore. The following day the boat was sent out of the pool, and in the trip down the river the rocks tore away the iron keel and rudder, also a small propeller-wheel which he had intended to operate.

Nissen rebuilt his boat and turned it into the smallest steamboat afloat. About a ton of iron was fitted to the wooden keel. When he came to Niagara Falls, in the summer of 1901, he announced his intention of taking soundings close up to the Horseshoe Fall in hope of discovering new facts about the great waterfall which is credited with excavating the gorge. After his boat was launched, he made several trips near the Horseshoe, accompanied by a young man named James Rich, who was tied on the deck of the boat for fear the wash of the river would sweep him away. Rich had several narrow escapes, but he stuck to the boat. Nissen gained no important facts by his alleged soundings in the vicinity of the falls, but hoped that he might have better luck in the whirlpool.

On Saturday afternoon, October 12, 1901, in the presence of the largest crowd that ever assembled to witness such a performance, Nissen made his second trip through the rapids. His craft, though a steamboat, had no steam up when going through the gorge. It simply floated like a log, and when it approached the rapids Nissen concealed himself under the deck. The smokestack

was carried away by the first waves, but the opening had been cov- 1902
ered in anticipation of such an occurrence. The boat entered the Dunlap
whirlpool safely, but the propeller and the rudder were carried away by striking driftwood. Some days later, Nissen and Rich again boarded the steamer to take soundings of the pool. But soon the rudder gave out, and the craft was drifting helplessly in the maelstrom. Hour after hour they whirled around, prisoners in the seething water. As the afternoon waned and the shadows of the stern, silent cliffs crept across the water, the men grew more and more desperate. They had kept up steam on the boat, and this made it very hot under deck, and not daring to leave the hatch open, they nearly suffocated. They were at the mercy of the currents, and any moment might be sucked out of the outlet and carried down the river over the route where Nissen's boat had been wrecked the year before.

About five o'clock that afternoon, the boat floated quite close to the Canadian side. Rich had told Nissen that should opportunity offer he would leap to the shore. Closer and closer the current swept the boat. Rich leaped and landed on a rock, but before Nissen could follow the boat was fifty feet from shore. Night had settled before Nissen could jump to the rocks. The boat is supposed to have sunk in the whirlpool.

The fact that Graham had five times successfully voyaged through the Whirlpool Rapids in a barrel led others to adopt this craft in 1901. The first to follow Graham last summer was Martha E. Wagenfuhrer, the wife of a professional wrestler. She selected Friday, September 6th, as the date of her trip, possibly with the hope that she might have a President of the United States in her audience, for that was the day President McKinley last visited Niagara. Quite a crowd collected, for she was the first woman to try the feat alone. She was resuscitated after being in the rapids over an hour.

Following Graham's barrel trip on July 14, 1901, he arranged to give a double performance with Maud Willard. It was planned that Miss Willard should make the barrel trip, and

1902
Dunlap

Graham would await her coming through the rapids at the whirlpool on the American side. If the barrel and its occupant were swept out of the pool, Graham was to swim out and go to Lewiston with it; if not, he was to go alone.

At 3.53 P. M. the barrel, with Miss Willard and her pet dog, were in tow of a small boat pulling out in the current. The barrel was set adrift in the middle of the river, and it shot right into the rapids. It received the usual tossing, and in four minutes was floating across the whirlpool. It was quickly seen by those who knew the pool that the currents were running in an unusual manner. Instead of being carried toward the Canadian shore, where many were ready to capture it, the barrel floated well toward the center, and round and round it swept. On the American shore Graham and others watched the barrel. At 4.58 o'clock it was sucked into a deep whirl, and two minutes later it sank from sight, drawn down into the depths of the whirlpool by the mighty forces at work there. It was a startling spectacle for the hundreds on the banks to witness, and all wondered if the barrel and its human occupant were gone forever. Soon the barrel jumped far out of the water as it was hurled up by the current, some hundreds of feet distant from where it had gone down, but it resumed its course with the current, drifting far out from the reach of those on shore.

It had not been long in sight before it was observed that it listed to one side, and those who had seen other barrel trips felt that something unusual had taken place inside the craft they were watching. Hopeful that the men on the Canadian side would capture the barrel, Graham, in order to give the moving-picture machine an opportunity to record his swim, was forced to leap into the water before sunset, and while the barrel was still floating in the pool he started for Lewiston. His swim was a success, and he has the credit of being the only person who has swum from the pool to Lewiston. When Graham returned up the gorge, he found the barrel and Miss Willard still imprisoned on the revolving waters of the wonderful pool.

Hour after hour passed, darkness fell, and the roar of the whirlpool came with a solemn sound to the men on shore. Huge bonfires were built for warmth and illumination. Messengers were sent to Niagara Falls to have the searchlight car of the electric line sent down the gorge, that the waters of the whirlpool might be fully illuminated. This was done, and after a while the great beam of white light shot across the waters from the American to the Canadian side. Now and then the tossing barrel could be seen, tumbling and rolling about on the waves and current. Nine o'clock came, and the girl had been imprisoned in the barrel over five hours. All knew the craft had air-holes, but how had Miss Willard stood the terrible strain, knowing that night had come? 1902 Dunlap

About 9.20 o'clock that night, an old river hand, standing about one of the bonfires, looked out on the waters of the pool and observed a piece of wood drifting in toward the shore — a sure sign that the currents were changing. Within a short time the barrel hove in sight within the light of the fire, and men swam out and caught it. When the manhole cover was removed, the little dog leaped joyously out, but Miss Willard was limp and lifeless. Possibly, if the dog had not been in the barrel, there would have been more air for Miss Willard, and she might have lived. She was buried in Oakwood Cemetery, and before many days her mother was placed in a grave at her side. It had been Miss Willard's hope that she might earn money to give her mother a pleasant home in her declining years.

During all these years of sensational feats at Niagara, until the summer of 1901 nobody ever voluntarily tried to go over the falls and live. At least two men tried to pretend to make the trip, but without success. When Mrs. Taylor arrived at the falls with a barrel, residents smiled at her statement that she would make the falls trip. Dropping a barrel and a human occupant over the Horseshoe Fall could have but one result, all agreed. But Mrs. Taylor was persistent. The fact that there was a trip

1902
Dunlap

through three-quarters of a mile of rapids above the fall before the frightful precipice was reached did not deter her.

On Sunday, October 20th, and again on the following Wednesday, the waiting crowds were disappointed. Owing to a high wind, the barrel could not be towed into the current. People became skeptical, but the next day Mrs. Taylor was true to her word. Starting out from Port Day, a mile above the falls, she was rowed to Grass Island. There she was strapped in the barrel and towed far out in the Canadian current. Just before the start, the craft was pumped full of air. Fastened to the bottom was a blacksmith's anvil weighing about one hundred pounds to keep the barrel upright in the water.

When within two hundred yards of the Canadian shore, one of the boatmen rapped on the barrel with his oar. This was the signal to Mrs. Taylor that she was to be cast adrift, and a minute later, at 4.05 o'clock, the line was cut. With all speed the boat hurried out of the dangerous current, while the barrel in which was Mrs. Taylor sped on toward the great Horseshoe. All who have viewed Niagara know the wild nature of the waters above the falls. Reef after reef extends from shore to shore, over which the tumbling torrent flows in splendid fury. It is a spectacle that delights the artist's eye, but one to strike terror to the heart of any would-be navigator. There is a descent of fifty-five feet in these whitened waves before the fall is reached, and through them Mrs. Taylor and her barrel shot. Tumbling, rolling, now and then it lingered under the foaming waters at the foot of a reef, but, reappearing, was swept on toward that awful brink over which no human being had passed and lived.

After the barrel came in sight, plunging down the rapids, little was said by the thousands gathered at every point whence the broad surface of the river could be seen. Each eye was strained to catch the movements of the small dark object tossing on the white-capped waves far out on the river. The last reef was passed. There was nothing but smooth, clear water now between the barrel and the brink of the Horseshoe. It felt the suction of

the fall. Faster, faster it moved, swinging round toward the Canadian side as it was pulled forward by the terrific force of the rushing waters. Just a moment it was visible on the brink, then with lightning-like rapidity it dropped, a distance of one hundred and sixty-five feet, into the seething, foam-lashed waters of the lower river. This broke the tremendous tension of the crowd, and every one made a wild rush to the edge of the high banks where the gorge could be seen. Before many of them got in position, the barrel had reappeared on the surface of the lower river and was floating downstream. It was caught in an eddy on the Canadian side and swung back between the wash of two eddies. It floated there for some minutes before it was caught, at 4.40, having passed over the fall at 4.23. The barrel was landed on a rock. The cover of the manhole was torn off, and when Mrs. Taylor raised her hand to wave to those about, a mighty cheer went up that told the multitude on the cliff that the Falls of Niagara had been conquered — and by a woman. It was necessary to saw a portion of the head of the barrel away to get Mrs. Taylor out. When this was done, she crossed a plank to land, bruised and shocked, but little injured. **1902** Dunlap

The woman who performed this remarkable feat gave her age as forty-three years, stating that the day of her performance was her birthday. She had had a varied experience in life, and admitted that she was in desperate need of money when she journeyed to Niagara. Her performance has cast a shadow on the feats of all previous rapids navigators, and now it is expected that the falls and not the rapids will be the scene of sensational feats to be performed by desperate men and women of the future.

STODDARD, JOHN L. Lectures. Bost.: Balch. 1902. Suppl. 2:131–143. **1902** Stoddard

A beautifully illustrated lecture on the beginning and recession of the Falls and the infinite variety of Niagara scenery.

1903

1903 Dunlap

DUNLAP, ORRIN E. The ice condition at Niagara river. (Sci. Am., Feb. 7, 1903. 88:93.)

With special reference to the ice bridge.

DUNLAP, ORRIN E. Remarkable diversion of Niagara's waters. (Sci. Am., Apr. 4, 1903. 88:241–242.)

The story of how the river bed by the American Falls was left nearly dry for several hours on March 22, 1903.

1903

Niagara Falls runs dry . (Harp. w., Apr. 4, 1903. 47:Pt. 1, 543.)

An unusual situation, due to ice formations above the Fall, which temporarily dried up the American side of the Falls, making the bed of the Rapids passable on foot.

1903

A new cave of the winds. (Eng. (Lond.): April 3, 1903. 95:345.)

Describes the construction of an artificial cave on the Canadian side of the Falls.

1903

Observation tower, Niagara Falls. (Eng. (Lond.): May 8, 1903. 95:470.)

Discusses the removal of a commanding viewpoint.

1903

Passing of the Niagara observation tower. (W. elec., Dec. 5, 1903. 33:430.)

1903

Remarkable phenomenon at Niagara. (Cur. lit., May, 1903. 34: 538–539.)

The drying up of the American Falls owing to the diversion of the waters by ice, March 22d.

1904

1904 Brandenburg

BRANDENBURG, BROUGHTON. The carnival of ice at Niagara. (Harp. w., Dec. 24, 1904. 48:pt. 2, pp. 1990–1994.)

Gives a description of the Falls in winter, the ice bridge and the ice effects, and the crowds that visit the Falls at this season. The account also contains several good pictures.

1904

(The) Captivity and sufferings of Benjamin Gilbert and his family, 1780–83. Reprinted from the original edition of 1784 with introduction and notes by Frank H. Severance. Cleveland. 1904. Pp. 129–130.

1904 Dorr

DORR, EBEN P. Niagara's historic environs. (Four-track news, Feb., 1904. Pp. 110–113.)

" This article is an invitation to the traveler, who comes from afar to view the mighty cataract and its surroundings, to go in more leisurely fashion and tarry by the old shrines of history which dot the way-side." **1904** Dorr

ROBINSON, CHARLES MULFORD. The life of Judge Augustus Porter, a pioneer in western New York. (Buf. Hist. Soc., pub., 1904. Vol. VII. See index.) **1904** Robinson

Brief accounts of conditions around the Falls in the beginning of the nineteenth century, based upon Judge Porter's reminiscences.

SULTE, BENJAMIN. Le Haut-Canada avant 1615. (Royal Soc. of Can. June, 1904. 2d ser. sec. I. 10:64, 67, 68, 73–83.) **1904** Sulte

A discussion of early notices and descriptions of the Falls and of the origin of the name.

1905

The largest waterfall in the world. (R. of R., April 1905. 31:491.) **1905**

Niagara Falls compared with the Ygnassu Falls in South America.

1906

DETMERS, ARTHUR. The Devil's Hole massacre. (The Niagara Frontier Landmarks Ass'n. Buffalo. 1906. Pp. 47–52.) **1906** Detmers

A brief but scholarly study of the massacre at the Devil's Hole and the portage around the Falls.

HOFF, W. *and* SCHWABACH, F. North American railroads. N. Y.: (1906) P. 24. **1906** Hoff & Schwabach

PORTER, PETER A. The first buildings ever erected by white men at Niagara Falls, in 1745. (Niagara Front. Hist. Soc. leaf.) n. d. **1906** Porter

The tradition of an Indian village on the rapids above the Falls; the trail, and later, the road along the portage; the trading-house and fort at the upper terminus of the portage.

PORTER, PETER A. How lake commerce began; La Salle's visits to the Niagara. Niagara Falls, N. Y. n. d. P. 11.

The author thinks that La Salle was the first white man to see the Falls. He reaches his conclusion by " historical reasonings " rather than by proof.

PORTER, PETER A. Niagara an aboriginal center of trade. Niagara Falls. 1906.

Niagara An Aboriginal Center of Trade

1906
Porter

The printed story of Niagara dates back only three centuries; and during the first three decades of even that period the references to this wonderful handiwork of Nature — which was located in a then unexplored region of a New World, a Continent then inhabited only by warring tribes of superstitious Savages — are few and far between.

Three facts relating to this locality — and three only — seem to be proven as ante-dating the commencement of that printed story.

That its " Portage " had long been in use.

That it was then, and long had been, a spot for the annual assemblage of the Indians " for trade."

That here, and here only, was found a certain substance which the Aborigines had long regarded as a cure for many human ills.

Before 1600, everything else that we think we know, and like to quote about Niagara, is only Indian Myth or Tradition; possibly handed down for Ages, orally, from generation to generation, amongst the Aborigines; or, quite as probable, it is the invention of some Indian or White man Mythologist of recent times; the presumption in favor of the latter being strengthened, when no mention of the legend, not even the slightest reference thereto, is to be found in any of the writings of any of the authors, who (either through personal visits to the Tribes living comparatively near to the Cataract, or from narrations told to them by Indians living elsewhere on this Continent) had learnt their facts at first hand, and had then duly recorded them,— until long after the beginning of the eighteenth Century.

It is probably to the latter class — modern traditions — even with all their plausibilities, based upon the superstitious and stoical nature of the best-known Legends concerning Niagara belong.

Three of those legends, especially, appeal to the imagination. One relates to Worship, one to Healing, one to Burial,— embracing the Deity, Disease, and Death.

The Legend of Worship is the inhuman yet fascinating one that the Onguiaahras (one of the earliest-known orthographies of the word Niagara), who were a branch of the Neutrals, and dwelt in the immediate vicinity of the Great Fall — and, according to Indian custom, took their name from the chief physical feature of their territory — long followed the custom of annually sacrificing to the Great Spirit " the fairest maiden of the Tribe "; sending her, alive, over the Falls in a white canoe (which was decked with fruits and flowers, and steered by her own hand) as a special offering to the Deity for tribal favor, and for protection against its more numerous and more powerful foes. 1906 Porter

And that, at the time of this annual Sacrifice, the tribes from far and near assembled at Niagara, there to worship the Great Spirit. If this Legend is based on fact, it would certainly have made the locality a famous place of annual rendezvous. The opportunities for the exchange of many and varied commodities — " trade "— would surely not have been neglected.

The Legend of Healing is, that anyone, Brave or Squaw, if ill, would quickly be restored to perfect health could they but reach the base of the Falls, go in behind the sheet of falling waters,— entering, as it were, the abode of the Great Spirit,— and, on emerging therefrom, be able to behold a complete circular Rainbow — which could symbolize the Deity's absolute promise of restoration to perfect health.

Of course, it was the difficulty and danger of descending into the Gorge, and of scaling the face of the cliff in returning — accomplishable in those days only by means of vines which clung to the rocks, or by crude ladders (formed of long trunks of trees, from which all branches had been lopped off about a foot from the trunk, and set upright, close to the face of the cliff) — that lends any plausibility to the legend.

The Legend of Burial was, that Goat Island was especially reserved as a burying-ground for famous chiefs and noted warriors.

1906 Porter

If this Legend was founded on fact, it certainly would have made Niagara at that time one of the best known and most frequented spots on the Continent; and at each visit for such burial, trade would doubtless have been carried on.

Indian legends connected with the Falls and the earliest references and first white visitors to the Falls.

1906 Wood

WOOD, EUGENE. Niagara. (McClure, Sept., 1906. 27:475–490.)

A clever account reminiscent and descriptive, of the Falls past and present, under private and public ownership; their effect on the beholder, and their duration.

1909

1909 Dunlap

DUNLAP, O. E. Dynamiting the Niagara ice jam. (Sci. Am., May 8, 1909. 100:349–350.)

An account of the jam of April 10th.

DUNLAP, ORRIN E. The recent subsidence of Niagara Falls. (Sci. Am., Mar. 6, 1909. 100:181, 187.)

The subsidence in question occurred February 14–16, 1909. Two views show Niagara dry and at normal.

1909

Extraordinary ice jams at Niagara Falls. (Eng. news, Apr. 29, 1909. 61:453.)

A history of conditions through February and April, 1909.

1909 Perkins

PERKINS, FRANK C. The great ice jam at Niagara. (Sci. Am., May 1, 1909. 100:339.)

An account of the effects of the ice upon the scenery, the Falls, and the power plants.

1911

1911 Johnson

JOHNSON, CLIFTON. Highways and by-ways of the Great Lakes. N. Y.: Macmillan. 1911. Pp. 38–54.

An interesting chapter on "tragic Niagara," dealing with the suicides and notoriety-seekers of the place.

1911

Niagara and Victoria. (Sci. Am., Sept. 2, 1911. 105:203.)

A comparison of the height and volume of the two falls.

1911

Niagara Falls in winter; its scenery and ice bridge. (Buffalo. n. d.)

WILLIAMS, J. DAVID, *ed.* America illustrated. N. Y.: The Arundel Print. n. d. Pp. 37–41. **1911** Williams

A brief description of the Falls, with some information on recession, and a very short account of the railway suspension bridge, two miles below the Falls.

1914

HOWLAND, WILLIAM B. Niagara Falls and the hundred years of peace. (Indep., June 22, 1914. 78:522–523.) **1914** Howland

A brief account of the various observances and memorials planned to commemorate the hundred years of peace between Great Britain and the United States. The article is illustrated by a drawing showing the bridge designed by T. Kennard Thompson to be erected at Niagara as a memorial to the part played by the river and cataract in the international relations of the two countries.

SUMMARY

The first fact to notice in this apparent miscellany of Niagara material is the multiplication of information concerning the Falls. It began with accounts in encyclopedias and gazetteers in the latter part of the eighteenth century — a most significant fact, for it cannot be doubted that it contributed much to the dissemination of Niagara information. In some cases, it served merely to keep alive the old errors. Often, however, these early accounts were first-hand descriptions by competent observers. They differ from the later scholarly researches which we cite in this chapter in content rather than in spirit.

Of an altogether different style from the serious reports and investigations just referred to are the various accounts of Niagara scenery and Niagara incidents written for the magazines in recent years. While accurate enough in detail their general purpose without doubt is often not so much to inform as to entertain, perhaps even to thrill. The latter seems to be the case with the tales of notoriety-seekers who have at one time or another used the Falls as a setting for their perilous feats. In the savage Indian the Falls inspired worship. He paid tribute here to the Great

Spirit, as many do today, but in our time, desperate adventurers have also used the Falls to defy death in their attempts for gain or notoriety. Strange that a sight which in one arouses the most exalted religious sentiment or the purest poetic impulse, to another suggests only possibilities for gain or attracting public notice.

Chapter VI

CHAPTER VI

FLORA AND FAUNA

1750

[1] KALM, PETER. A letter from Mr. Kalm, a gentleman of Sweden, now on his travels in America, to his friend in Philadelphia, containing a particular account of the great fall of Niagara, September 2, 1750. (Gentleman's mag., Jan., 1751. 21:15–19.) 1750 Kalm

The description of the Falls contained in this letter is the first one written by a scientist. Kalm, who was an eminent Swedish botanist, studied the flora of the region, and his name survives in two of the wild flowers found at the Falls today — the *Lobelia Kalmianum* and the *Hypericum Kalmii*, a species of the St. Johnworts. It is unfortunate that no record has ever been found in his scientific writings of this visit to the Falls.

1795–1796

[2] LIANCOURT, *Duke* DE LA ROCHEFOUECAULT. Travels through the United States of North America, the country of the Iroquois, and Upper Canada, in the years 1795, 1796, and 1797, with an authentic account of Lower Canada. Lond.: Phillips. 1799. 1:225. 1795–96 Liancourt

The portage was formerly on the other side of the river; but as this, by virtue of the treaty, falls under the American dominion; government has removed it hither. The whole country, though extremely sandy, is covered with oak, chestnuts, and fine hickory trees, and such parts, as are better watered, bear, in common with all other parts of America, ash and maple-trees.

[1] See chapter II for letter.

[2] For fuller extract, see chapter II.

1810

1810 Clinton

CLINTON, DE WITT. The life and writings of De Witt Clinton by William W. Campbell. N. Y.: Baker and Scribner. 1849. Pp. 130–131.

The account of his visit to Niagara and vicinity in 1810 is to be found on pages 127–136.

Goat Island belongs to the State, and must be extremely valuable for hydraulic works. The general idea is that it would answer for a State Prison, being impracticable to pass from it. But this is a mistake; it can be easily reached by a canoe from above. I saw a man who had potatoes planted on it, and who visited it frequently. Stedman used to ride there on horseback. The land is very fertile. As well for its nearness to the dead carcasses below the Falls as its seclusion, eagles build their nests on this island, which is covered with wood. Last autumn, a year, a large buck-deer was seen for two or three weeks, wading a short distance into the Rapids from this island and retreating. He had probably drifted down from above, and not knowing the safe passage to the shore he no doubt perished at the Cataract.

1819

1819 Howitt

HOWITT, EMANUEL. Selections from letters written during a tour through the United States in the summer and autumn of 1819. . . . Nottingham: J. Dunn. (1820). Pp. 128–132.

The author was a member of the Society of Friends, who visited the Niagara region to report on the work being done for the Indians by the Quakers.

Eighth month, 6th.— On leaving the Indians, we proceeded that evening ten miles towards the Falls, which we reached at eleven the next morning. As we drew nearer them, the country became more and more thinly inhabited, the soil more strong and clayey, and the distant war of the cataracts, seemed to make the surrounding solitude more sensibly felt. To attempt to describe this stupendous object, would be vain; . . .

. . . . .

. . . This island [Goat Island], which divides the stream, was, a short time ago, the secure eyry of a number of Bald Eagles; but the bridge exposed them to the intrusion of travellers, and they have totally deserted it. 1819 Howitt

. . . As we sat in the boat, I took up some of the foam that covered the waters, and, squeezing it in my hand, found that it possessed a sort of solidity that astonished me, more resembling the compression of snow than of foam: a gentleman has since assured me, that I might have carried it with me, in that state, to England. He attempted to explain this singular phenomenon, by distributing its consistency to a vast portion of sulphurous and aluminous matter, which is carried down by the rapids, and incorporated with the foam by the force and agitation of the cataract. By the rapids, on the American side, are erected several mills; at one of which, a man will cut 270 small nails per minute. On that side, and on Goat Island, grew some of the largest arbor vitae, or white cedar trees, I ever saw,— some of them measuring seven feet round. We walked back on the Canadian side of the river, which is wide and level, with no rapids, except in the immediate vicinity of the falls.

On this side we observed some good farms, well managed, and exhibiting (what was become a novelty to us) clean fallows and good large flocks of sheep.— The inhabitants seem to exult in the idea, that they are British subjects, and *not* dirty yankeys.

The spirit of hostility and jealousy, generated by the mutual outrages of boundary territories, is but too visible here. The memory of war is recent in their bosoms, and the vestiges of its ruins are still before their eyes. We saw several graves, enclosed with palisades, which (they told us) were those of British officers, slain during the war,— some of whom were of distinction. This desolating scourge had destroyed the houses of the settlers, on both sides the river, but particularly the Canadian, which is more cultivated. On the other, Buffalo was completely burnt down, with the exception of one house. . . .

1820

1820 Audubon

AUDUBON, JOHN JAMES. Ornithological biography. Edinburgh: Adam Black. 1831. 1:362–363.

This Niagara chapter is descriptive of a visit which Audubon made there, presumably in 1820.

After wandering on some of our great lakes for many months, I bent my course towards the celebrated Falls of Niagara, being desirous of taking a sketch of them. This was not my first visit to them, and I hoped it should not be the last. . . . But digressions aside,— I directed my steps towards the Falls of Niagara, with the view of representing them on paper, for the amusement of my family.

Returning as I then was from a tedious journey, and possessing little more than some drawings of rare birds and plants, I reached the tavern at Niagara Falls in such plight, as might have deterred many an individual from obtruding himself upon a circle of well-clad and perhaps well-bred society. Months had passed since the last of my linen had been taken from my body, and used to clean that useful companion, my gun. I was in fact covered just like one of the poorer class of Indians, and was rendered even more disagreeable to the eye of civilized man, by not having, like them, plucked my beard, or trimmed my hair in any way. Had Hogarth been living, and there when I arrived, he could not have found a fitter subject for a Robinson Crusoe. My beard covered my neck in front, my hair fell much lower at my back, the leather dress which I wore had for months stood in need of repair, a large knife hung at my side, a rusty tin-box containing my drawings and colours, and, wrapped up in a worn-out blanket that had served me for a bed, was buckled to my shoulders. To every one I must have seemed immersed in the depths of poverty, perhaps of despair. Nevertheless, as I cared little about my appearance during those happy rambles, I pushed into the sitting-room, unstrapped my little burden, and asked how soon breakfast would be ready.

In America, no person is ever refused entrance to the inns, at least far from cities. We know too well how many poor creatures are forced to make their way from other countries in search of employment or to seek uncultivated land, and we are ever ready to let them have what they may call for. No one knew who I was, and the landlord looking at me with an eye of close scrutiny, answered that breakfast would be on the table as soon as the company should come down from their rooms. I approached this important personage, told him of my avocations, and convinced him that he might feel safe as to remuneration. From this moment, I was, with him at least, on equal footing with every other person in his house. He talked a good deal of the many artists who had visited the Falls that season, from different parts, and offered to assist me, by giving such accommodations as I might require to finish the drawings I had in contemplation. He left me, and as I looked about the room, I saw several views of the Falls, by which I was so disgusted, that I suddenly came to my better senses. "What!" thought I, "have I come here to mimic nature in her grandest enterprise, and add *my* caricature of one of the wonders of the world to those which I here see? No.— I give up the vain attempt. I shall look on these mighty cataracts and imprint them, where alone they can be represented,— on my mind!"

1820 Audubon

Had I taken a view, I might as well have given you what might be termed a regular account of the form, the height, the tremendous roar of these Falls; might have spoken of people perilling their lives by going between the rock and the sheet of water, calculated the density of the atmosphere in that strange position, related wondrous tales of Indians and their canoes having been precipitated the whole depth;— might have told of the narrow, rapid, and rockbound river that leads the waters of the Erie into those of Ontario, remarking *en passant* the Devil's Hole and sundry other places of objects;— but supposing you had been there, my description would prove useless, and quite as puny as my intended view would have been for my family; and should

1820 Audubon

you not have seen them, and are fond of contemplating the more magnificent of the Creator's works, go to Niagara, reader, for all the pictures you may see, all the descriptions you may read, of these mighty Falls, can only produce in your mind the faint glimmer of a glow-worm compared with the overpowering glory of the meridian sun.

I breakfasted amid a crowd of strangers, who gazed and laughed at me, paid my bill, rambled about and admired the Falls for a while, saw several young gentlemen *sketching on cards* the mighty mass of foaming waters, and walked to Buffalo, where I purchased new apparel and sheared my beard. I then enjoyed civilized life as much as, a month before, I had enjoyed the wildest solitudes and the darkest recesses of mountain and forest.

1820 Clinton

HIBERNICUS (DEWITT CLINTON). Letters on the natural history and internal resources of the state of New York. N. Y. Bliss and White. 1822. Pp. 144, 185–186, 198–210.

These letters first appeared in the columns of a newspaper during the year 1820. They contain much of scientific interest, for the author was a keen observer and had a well-trained mind.

Western Region, August 1820.

I found the upper and middle stratum of the great cataract of Niagara to consist of fetid carbonate of lime, commonly called stink stone, or swine stone; and the inferior stratum of a compact, stratified red sand stone, which strikes fire with steel, scratches glass, and which, when moistened and rubbed, emits a smell of sulphuretted hydrogen gas. It is also infusible before the blow pipe, and does not effervesce with acids. The super strata, consisting of swine stone, are more strongly impregnated with sulphuretted hydrogen gas, and contain small quantities of martial pyrites, alumine and silica. This stone exists in various parts of this region, and is an indication of coal, so far forth as bitumen is concerned in its composition.

. . . . .

Western Regions, Aug. 1820.

. . . . . .

In various places I have seen the *falco lencocephalus*, or bald eagle; the *falco ossifragus*, or grey eagle; and the *falco haliaetus*, or osprey. . . . 1820 Clinton

The immense quantities of fish which collect below the falls of Niagara, and which inhabit that river and the mouth of Lake Erie, necessarily draw together these birds, and I have never seen so many as appear to occupy this region.

. . . . . .

Cataract of Niagara, September 1820.

Lewiston is about seven miles from the Falls of Niagara, and in passing from the former to the latter place, I observed on the top of the high hill or slope of Lewiston, the remains of the old way by which the French drew up their goods which they sent round the cataract. A crane was fixed on the summit of the hill, and an inclined plane down the descent, in which sleighs were placed, and as articles were conveyed up in one vehicle others were let down in another.

. . . . . .

Goat Island derives its name from its being appropriated to goats by Stedman, the former possessor of Fort Schlosser. It now belongs to individuals, and is connected with the right bank of the river by bridges. It was formerly supposed that it would make an excellent place for a state penitentiary on account of the impracticability of passing from it previous to the erection of the bridges; but this is a mistake. It can be easily reached by a canoe from the place where the rapids separate at the head of the island, but it is difficult to retire. Stedman used to ride to it on horseback, and I saw a man who had planted potatoes on it in former times. I observed trees on it, on which are inscribed the names of visitors as far back as 1769. A skeleton was found buried in a grave, and indications of a canoe being made about

1820
Clinton

forty years ago were also observed. I heard the singing of locusts and birds. It is covered with large trees, and the soil is uncommonly good, being composed of a fine vegetable mould. This island was formerly the place where eagles erected their aeries, as well on account of its seclusion, as its propinquity to the carcases below the falls. . . . Volney says that he found at the bottom of the precipice the carcases of some deer, and *wild boars*, which the current had hurried down the cataract on their attempting to swim across the river above it. As there are no wild boars in this country, this shows how inattentive the most observing travellers are to objects of natural history. It is generally supposed that every animal is deprived of life which passes over the falls, but this is a mistake. Tame geese frequently escape; a dog once got clear with a broken rib; and two sheep were found below the cataract, one of which was alive. On the other hand, the probability of escaping with life is scarcely any. Wild geese, deer, fish, and other animals, are to be seen dashed to pieces.

. . . . .

The country above the heights of Lewiston and Queenston is a vast plain, from which there is an abrupt descent of near three hundred feet, into another plain at Lewiston, and in which plain is Lake Ontario. The upper slope is table land, as well as the plain below, and this produced the French denominations of Upper and Lower Canada. The river divides the slope between the heights of Lewiston and Queenston, which is composed of the same materials on each side. This fact in connexion with the scanty covering of earth which the rocks on the top of the bank retain in other places on the western shore, and the parallel arrangement of alluvial earth on the eastern side, now two hundred feet above the surface of the river, furnishes proof little short of demonstration, that the Niagara river has sawed through the rock from Queenston to the present falls. At the heights of Lewiston the upper stratum is composed of solid masses of lime stone resting on red indurated brittle clay, then at a great distance

from the top, and below this clay, a stratum of red sand stone, twelve or fifteen feet thick appears; thence to the bottom of the precipice red and blue indurated clay and stones of the same colour, chiefly red. 1820 Clinton

. . . . .

From Lake Erie to Fort Schlosser there is a fall of 15 feet
To Lewiston, say 332
To Fort Niagara, say 334

The upper strata of this region from Lake Erie to Lewiston, are formed of calcareous rock of various kinds, which rests upon sand stone, chiefly red and friable, and which reposes on red clay, chiefly indurated. In comparing the appearances of stone with the stratified levels, the continuity and identity of the former will be obvious.

The chasm at the bottom of the cataract is 347 feet deep of water. A beautiful white substance is found here — supposed by the vulgar to be a concretion of foam, consolidated by the power of water — but it is carbonate and sulphate of lime, which has been reunited after being in a state of solution. The lamellar gypsum found here is very fine, as well as the white amorphous.

The recession of the falls from Lewiston and Queenston, is easily explained on this geological view of the country. The fragile materials which compose the foundations of the great calcareous rocks are continually and gradually wearing away by the action of water, and by a partial exposure to the atmosphere; the removal of the sub-strata will necessarily produce a precipitation of the super-incumbent rocks into the watery gulf. The progress of this operation is obvious — the immense bodies of ice which are carried down from Lake Erie, must also be a powerful auxiliary, and frost and earthquakes unquestionably contribute greatly to the production of these results.

If below the outlet of Lake Erie, any chasm should be produced by earthquakes or any other cause which would remove the lime stone rocks, and enable the water to reach the soft sand

1820
Clinton

stone and red clay, the fissure would enlarge, and in course of time the whole intervening rocks would be swept away, and Lake Erie would plunge into Lake Ontario. The great plateau, or table land, below Lewiston, would then be deluged, and the age of Deucalion would visit this portion of the great western region.

At the feet of great falls of water and in the bosom of sequestered ravines, the devotee of natural science generally finds a fertile field of investigation. This cataract however does not furnish many interesting specimens of mineralogy, but its neighborhood is rich in botany. The banks of the river about the falls are lined with white pine and cedar.

. . . . .

The passage of the river below the cataract is not considered dangerous. There is a boat stationed there for the conveyance of passengers, in which I have passed. During the late war smuggling was carried on in that direction in the night time, and before a ladder was erected on the east bank, people frequently passed over from Canada to steal apples at Fort Schlosser.

1820
Schoolcraft

SCHOOLCRAFT, HENRY ROWE. (Visit to Niagara Falls, 1820.) (*In his* Narrative journal of travels through the northwestern regions of the United States extending from Detroit through the great chain of American lakes, to the sources of the Mississippi river . . . in the year 1820.) Albany: E. and E. Horsford. 1821. Pp. 33–47.)

Schoolcraft visited the Falls in May, 1820, as a member of the expedition under General Cass. He approached the Falls from Buffalo, tells of the distance at which he first heard the sound of the Falls, describes his first impressions and discusses the inaccuracy of various writers in their descriptions of the Cataract, notably Hennepin and some of the earlier visitors to the region, and dwells upon the importance of knowledge of the action of the Falls for geological accuracy and research.

What has been said by Goldsmith, and repeated by others, respecting the destructive influence of the rapids above, to ducks and other water fowl, is only an effect of the imagination. So far from being the case, the wild duck, is often seen to swim down the rapid to the brink of the Falls, and then fly out, and repeat

the descent, seeming to take a delight, in the exercise. Neither are small land-birds affected on flying over the Falls, in the manner that has been stated. I observed the blue bird and the wren, which had already made their annual visit to the banks of the Niagara, frequently fly within one or two feet of the brink, apparently delighted with the gift of their wings, which enabled them to sport over such frightful precipices, without danger. . . . 1820 Schoolcraft

Nothing in the examination of the geological constitution, and mineral strata of our continent, conveys a more striking illustration of its remote antiquity, (still doubted by many) than a consideration of the time, it must have required for the waters of Niagara, to have worn their channel, for such an immense distance, through the rock. It is true, we are in possession of no certain data, for estimating the annual rate of their progress, or for comparing the results with the Mosaic history of the earth. All that can be presumed is, that this progress, is now as rapid, as it was in former ages. The discovery of these Falls does not appear to have been made, until an hundred and eighty-six years after the first visit of Columbus to the American continent in 1492, or a hundred and eighty years after the discovery of North America by Cabot, in 1497. I assume the period of La Salle's visit, in 1678, as the basis of these deductions, but my opportunities of research, do not allow me to state with certainty that he was the first visitor, who has furnished a printed account of them. He was followed by La Hontan, in 1683, and by the Jesuit, Charlevoix, in 1721; but, they give no accounts which are sufficiently precise, to enable us to determine what changes have since taken place in the aspect of the Falls. It was not, indeed, until after the dismemberment of the Iroquois confederacy, that the path to the Falls, was opened to the English Colonies, the date of whose unmolested intercourse with this region, cannot, however, precede that of the ratification of the definitive treaty of peace, with Great Britain, in 1784. It is, therefore, only *thirty-six years*, since it has been the free and fashionable resort of all sections of the Union. Maps and descriptions are now extant, which will enable us to fix the rate

1820 Schoolcraft

of its progress, on the expiration of the present century, and we should not be disappointed in our anticipations, if its progress is found, greatly to exceed the prevalent expectation. To aid in the determination, the Island of Iris, which extends from the brink of the Fall, up the river, and which is now connected with the shore, by a wooden bridge, appears to present great facilities. A simple measurement of its length, with a monument for recording it at its head, would convert it into a graduated scale, and the point of the indentation of the Horse Shoe Fall, could, in like manner, be perpetuated on either shore, by a series of corresponding celestial observations, for determining the longitude of the extreme point of that incurvation. Distant ages would thus be furnished with data, the precision of which, would probably enable them to throw new and important lights on the history of the earth, and the changes it has undergone. Is this suggestion of too visionary a nature, to merit the consideration of geological societies?

1822

1822 Blane

BLANE, *Capt.* WILLIAM NEWNHAM. An excursion through the United States and Canada during the years 1822–23. . . . Lond.: Baldwin, Craddock and Joy. 1824. Pp. 405–406.

Few places would afford a more agreeable summer's residence than the neighborhood of the falls. There is plenty of shooting to be had at a short distance, and the fishing is perhaps the best in the world. Thousands of salmon trout of a great size, together with white fish, etc., are caught immediately below the falls; and the numbers of large sturgeon that come up to the same place, afford excellent sport to those who are at all dexterous in throwing a fish spear. Above the falls also, a great quantity of very large fish is to be caught, either with nets or with the hook and line. While I was at Niagara the weather was uncommonly fine and warm, and the river, at a mile or two above the rapids, was spotted over every night in the most picturesque manner, with canoes carrying lighted torches of pitch-pine. Out of these boats

From Amérique Septentrionale — État de New-York

GENERAL VIEW OF NIAGARA FROM THE CANADIAN SIDE

From a Lithograph of a sketch by J. Milbert, 1818

the settlers and Indians transfix with their spears a great number of very large fish which are attracted by the light. 1822 Blane

1823

TALBOT, EDWARD ALLEN. Five years' residence in the Canadas; a tour through part of the United States of America, in the year 1823. Lond.: Longman, Hurst, Rees, Orme, Brown, and Green. 1824. 1:123–140. 1823 Talbot

This book is of little value scientifically except for "occasional glimpses of a form of life which existed only for a few years."

The river, immediately beneath the Falls, affords a greater quantity of fish than are to be found in any other piece of water of the same extent in the world. Snakes of different descriptions also abound upon the banks.

. . . . .

Previous to the settlement of the country along the banks of the Niagara river, great numbers of wild beasts, birds, and fishes, might be seen, dashed to pieces, at the bottom of the Falls; and innumerable birds of prey were continually hovering over their putrid carcasses. But since this part of the country has been thickly settled, scarcely anything is to be found in the bed of the river below the Falls, except fishes, and a few water-fowl, which, on alighting in the rapids, are unable to take wing again, and are soon hurried down the dreadful abyss.

1824

AUDUBON, JOHN JAMES. Audubon and his journals, by Maria R. Audubon; with notes by Elliott Coues. N. Y.: Scribner. 1897. 2:286–288. 1824 Audubon

Under date of August 24, 1824, the great American ornithologist tells of one of his several visits to Niagara.

The life of John James Audubon, the naturalist. Ed. by his widow. N. Y.: G. P. Putnam & Sons. 1871. Pp. 108–109. 1824

An account of Audubon's visit to the Falls on August 24, 1824.

August 24. Took passage for Buffalo, arrived safely, and passed a sleepless night, as most of my nights have been since I

1824 began my wanderings. Left next morning for the Falls of Niagara; the country is poor, the soil stiff white clay, and the people are lank and sallow. Arrived at the hotel, found but few visitors, recorded my name, and wrote under it, " who like Wilson, will ramble, but never, like that great man, die under the lash of a bookseller."

All trembling I reached the Falls of Niagara, and oh, what a scene! my blood shudders still, although I am not a coward, at the grandeur of the Creator's power; and I gazed motionless on this new display of the irresistible force of one of His elements. The falls, the rainbow, the rapids, and the surroundings all unite to strike the senses with awe; they defy description with pen or pencil; and a view satisfied me that Niagara never had been and never will be painted. I moved towards the rapids, over which there is a bridge to Goat island, that I would like to have crossed, to look on the water which was rushing with indescribable swiftness below, but was deterred from the low state of my funds. Walking along the edge of the stream for a few hundred yards, the full effect of the whole grand rush of the water was before me. The color of the water was a verdigris green, and contrasted remarkably with the falling torrent. The mist of the spray mounted to the clouds, while the roaring below sounded like constant heavy thunder, making me think at times that the earth was shaking also.

From this point I could see three-quarters of a mile down the river, which appeared quite calm. I descended a flight of about seventy steps, and walked and crouched on my hams along a rugged, slippery path to the edge of the river, where a man and skiff are always waiting to take visitors to the opposite shore. I approached as near the falling water as I could, without losing sight of the objects behind me. In a few moments my clothes were wet. I retired a few hundred yards to admire two beautiful rainbows, which seemed to surround me, and also looked as if spanning obliquely from the American to the Canadian shore. Visitors can walk under the falling sheet of water, and see

through it, while at their feet are thousands of eels lying side by side, trying vainly to ascend the torrent. 1824

WATERTON, CHARLES. Wanderings in South America, the north-west of the United States, and the Antilles, in the years 1812, 1816, 1820, and 1824. Lond.: B. Fellowes. 1828. Pp. 264–269, 278. 1824 Waterton

The author, an English naturalist and traveller, inspired by Wilson's *Ornithology of the United States*, came to look for bugs and birds but found few specimens. He paid scant attention to the scenery of the Falls, but was undeniably more interested in inns, the American ladies and his own sprained ankle.

From the press of this city [Philadelphia] came Wilson's famous "Ornithology." By observing the birds in their native haunts, he has been enabled to purge their history of numberless absurdities, which inexperienced theorists had introduced into it. It is a pleasing and a brilliant work. We have no description of birds in any European publication that can come up to this. By perusing Wilson's "Ornithology" attentively before I left England, I knew where to look for the birds, and immediately recognized them in their native land.

Since his time, I fear that the white-headed eagles have been much thinned. I was perpetually looking out for them, but saw very few. One or two came now and then, and soared in lofty flight over the falls of Niagara. . . .

1826

CLINTON, GEORGE W. Journal of a tour from Albany to Lake Erie by the Erie canal in 1826. (Pub. Buf. Hist. Soc. 14:292–293.) 1826 Clinton

I have now seen the greatest fall (all circumstances considered) in existence, and must confess that it did not make a durable impression on me. I have stood on the point of Goat Island, on Table Rock, and have viewed it from every point. I have hung with my body partly on Table Rock and gazed at the rage and turmoil below, and have felt that nought that I had ever

1826
Clinton

witnessed could so powerfully have affected me. I recollect but little of it, now, and would most probably speak but coldly of its beauties. Such things affect me only when present.

Only two strata are visible at the falls — the calciferous slate and the geodiferous lime-rock. At Devil's Hole, 5 miles below, the rest are visible, in the same order in which they are at Genesee falls. This place we intended to have visited, but want of time prevented it. During the excursion two porcupines (*Histrix dorsata*) were slain. Their quills were not more than 3 or 4 inches in length.

On Goat Island (by some called Iris) we were shown a piece of a grapevine about six feet long, which must have averaged six inches in diameter. The *podophyllum peltatum* was in flower, and vegetation seemed to be far more forward in the immediate vicinity of Niagara than at points more remote, owing probably to the continual moistness of the atmosphere. They say that they are exempt from the late frosts which are so injurious to the agricultural interests of this section of our country.

The bridge to Iris was constructed under the direction and at the expense of Augustus Porter. Every pier is protected by an eddy or by an immense rock there placed by the hand of nature, a circumstance which was particularly remarked by Red Jacket, and drew from him the exclamation, "The damned Yankees take advantage of everything!"

On the island and on the shore we were shown some of the Lockport specimens which were for sale at the moderate price of $3 apiece — that is, common ones — the better ones sometimes rising much higher (one he asks $25 for) and the worst being rather lower. They were handsome, but any man can procure as good ones for the trouble of detaching them from the rocks at Lockport. On inquiry I found that this rascally attempt to impose upon the public originated as usual from the ignorance and extravagance of our Southern brethren, those pigeons for every knave to pluck. At the foot of the American stairs once

was a large block of stone containing considerable sulp. of Strontium, but the greediness of collectors has demolished it. I picked up a little coarse agate, snowy gypsum, brown spar, dog-tooth spar and blende. 1826 Clinton

1829

HEAD, *Sir* GEORGE. Forest scenes and incidents, in the wilds of North America; being a diary of a winter's route from Halifax to the Canadas, and during four months' residence in the woods on the borders of Lakes Huron and Simcoe. Lond.: John Murray. 1829. Pp. 329–334. 1829 Head

I was scarcely out of the town [Fort George], when I was surprised and pleased at the totally different appearance of the country, to that of any part of North America I had yet visited. That the road to the Falls of Niagara is one of considerable traffic, and better, in consequence, than other roads in the country, is not to be wondered at: but I could really fancy myself transported to a cultivated country in Europe, and on the high road towards some opulent city. As I rode parallel to the Niagara river, which rolled its course on the left hand below me, through a rich ravine, whose elevated banks were covered with ornamental trees and shrubs, I called to mind the banks of the Garonne in the south of France, to which the country bore a striking resemblance. The rich diversity of foliage which prevailed on every side, was a kindly relief to the eye, long overwhelmed by the prevalence of the dismal black pine, and now dwelling with grateful delight on the abundant variety of nature, disposing in tasteful succession the wild peach, cherry, sassafras, hickory, aspen, sycamore, etc.

. . . . .

I rode on till I came to the inn where I was to leave my horse, and taking a guide with me, proceeded on foot. We descended towards the river, crossing some fields covered with high dry grass, with a rich bottom of clover and thyme. My guide cautioned me to beware of rattlesnakes, which he said were numerous just where we were. None, however, did I see or hear.

1831

1831
Wilson and Bonaparte

WILSON, ALEXANDER *and* BONAPARTE, CHARLES LUCIEN. American ornithology; or the natural history of the birds of the United States. Ed. by Robert Jameson. 4 vol. Edinburgh: Constable and Co. 1831. 1:23.

Wilson was born at Paisley, Scotland, in 1766, and emigrated to the United States in 1794. His visit to Niagara was made in 1804, four years before the publication of the first volume of his "American Ornithology." His work was completed by Charles Lucien Bonaparte — nephew of the great Napoleon — who lived near Philadelphia from 1822 to 1828 and made a careful study of the birds of that locality.

The celebrated Cataract of Niagara is a noted place of resort for the bald eagle, as well on account of the fish procured there, as for the numerous carcasses of squirrels, deer, bears, and various other animals, that, in their attempts to cross the river above the Falls, have been dragged into the current, and precipitated down that tremendous gulf, where, among the rocks that bound the Rapids below, they furnish a rich repast for the vulture, the raven, and the bald eagle. . . .

1834

1834
Wied-Neuwied

[1] WIED-NEUWIED, MAXIMILIAN ALEXANDER PHILIPP, *Prinz* VON. Travels in the interior of North America, with numerous engravings on wood and a large map; translated by H. Evans Lloyd. Lond.: Ackerman & Co. 1843. Pp. 493–496.

At a short distance from the village of Niagara, the river . . . begins to flow in an uneven rocky bed with a rapid descent, and its whole surface is, in many places, in violent commotion, covered with white foam, and, as it were, boiling, in consequence of its breaking in high waves against the masses of rock. Portions of these rocks, the larger of which deserve the name of islands, are covered with pines, some green, others in a decayed state: of these rocky islets there are fifteen above the falls. The pines being frequently broken and snapped, and here

[1] The original from which this translation is made is cited in chapter III.

and there piled up in the water, greatly contribute to heighten the effect of the savage grandeur and sublimity of the scene. The roaring of the cataract is heard at a considerable distance, and lofty columns of mist and vapour ascend into the air. The stranger is conducted from the village to the above mentioned rapid, and then proceeds, by a long, strongly built wooden bridge over the end of the rapid, to Bath Island, where there are warm and cold baths. . . . A considerable paper-mill has been erected here, and a toll for passing the bridge is paid, once for all, for the whole time you may remain here. The toll-keeper sells refreshments and various curiosities of the country, minerals, Indian rarities, and the like. 1834 Wied-Neuwied

A second bridge leads from Bath Island to Goat Island which is about seventy acres in extent, entirely covered with a beautiful forest of sugar maples, beeches, horn-beams, elms, birches, &c., beneath which the asarabaca, mayapple, and various other plants, are growing; none of them were, however, in flower. The shores of this island are shaded by old pines and very large white cedars, such as we should in vain look for in Europe, and many fine shrubs grow on the banks. There were formerly a great number of Virginian deer in this beautiful forest, but they grew so familiar and became so troublesome by running after strangers that they were removed. The blue headed jay and the Hudson's Bay squirrel are numerous. From the bridge which leads to Goat Island there is a convenient path, on the right hand, which goes along the shore through the wood; and after proceeding a short distance, the stranger suddenly finds himself on the rather steep declivity, immediately above the fall of the right or southern arm of the river, which is called the American branch. The sight is striking, and much grander than all the descriptions I had read of it had led me to conceive. . . .

The southern or American part of the fall is divided by a narrow rocky island . . . to which a bridge has been thrown. This rocky island is closely overgrown with white cedar (*Arbor vitae*), the tall, thick, whitish trunks of which, with their

1834 Wied-Neuwied

stiff, extended boughs, scarcely leave space for the shrubs that grow between them, in which the cedar bird (*Bombycilla cedrorum*) builds its nest. The northern chatterer or silk tail, of which the Prince of Musignano has given a plate in his "Supplement to Wilson's Ornithology," is likewise found here in small companies during the winter.

. . . . .

Beautiful plants grow among the boulders, the rocks on the banks of the river, such as the geuldar rose, the white cedar, the *Rubus odoratus*, now flowering in all its loveliness, the lime, maple, and sumach.

1836

1836 Rafinesque

RAFINESQUE, CONSTANTINE SAMUEL. A life of travels and researches in North America and the south of Europe. Phila.: for the author by F. Turner. 1836. P. 81.

The author records his admiration of the Falls and states that he spent one day on each side of the Falls studying the geology and botany of the region, and taking maps and views. His visit was evidently made between 1825 and 1830.

1841

1841 Gurney

GURNEY, JOSEPH JOHN. A journey in North America, described in familiar letters to Amelia Opie. Norwich: Printed for private circulation. 1841. Pp. 322–323.

Goat Island is a luxuriant spot. The shumach trees, with their red bunches of hairy berries, were at this time adorning it; and we were refreshed, during our walk, with wild fruits — raspberries, small prickly gooseberries, and mandrakes which resemble our largest gooseberries, with a very thick rind. They are the fruit produced by the plant called the may-apple. Even when one has turned one's back upon the falls, the walk round this little island is quite delightful. The timber upon it is beautiful; and the rapids, on each side of it, form a spectacle which, were it not for the greater glory near at hand, might justly be called magnificent. From the sublime pleasures of these scenes, there

was but one deduction — the total absence of anything approaching to solitude. The rail-roads of America have rendered Niagara only too accessible; and Goat island is no longer the wild resort of adventurous lovers of scenery, but a popular promenade for the gentility of Boston, New York, and Philadelphia. 1841 Gurney

. . . . .

The limestone rocks in the immediate neighbourhood of the falls, are some of them *geodiferous*, and others *cornetiferous*. The former are filled with little cavities containing crystals of sulphate of lime; and latter present fragments of hornstone, and certain fossil remains of a zoophite which is shaped like the top of a horn.

1850

AGASSIZ, LOUIS. Lake Superior: its physical character, vegetation, and animals, compared with those of other and similar regions. With a narrative of the tour by J. Elliot Cabot. . . . Bost.: Gould, Kendall, and Lincoln. 1850. Pp. 12–20. 1850 Agassiz

Lectures on the geology and botany of the region delivered by Professor Agassiz in June, 1848, together with an account of the activities of the company, among them a moonlight bath in the Hermit's Fall. A list of the forest trees at Niagara is appended.

1853

PATTON, EDMUND. A glimpse at the United States and Northern States of America, with the Canadas, comprising their rivers, lakes and falls during the autumn of 1852. . . . Lond.: Effingham Wilson. 1853. Pp. 91–92. 1853 Patton

The Canadian side, on which the Clifton Hotel is situated, affords, perhaps, the most perfect view of the entire falls, giving the very breadth and length of the millions of tons of water, in rapid succession, rushing impetuously into the abyss beneath, a depth of some hundred feet. "Iris Island," commonly called "Goat's Island" divides the fall into two unequal parts, which

1853
Patton

are, however, brought into connection by sundry bridges and several small islands. Wandering about on this spot, was perfect enchantment. Magnificent trees of oak, ash, maple, pine, and cedar trunks, fallen from age, or the wintry blast, stretching their limbs across the stream, all added to the agitated turmoil created by the rapids, the roaring of the great fall, and the murmuring of the lesser streams.

. . . I could have wished to have visited this enchanted place at the time when the red man alone communed with the Great Spirit, surrounded with Indian tribes, or pioneers; but a town is springing up on the very edge of the precipice; saw mills, and hotels, as large as the "Astor," or "Irvine House" are erected: so that in one step, from the most perfect artificial existence, you are in a moment plunged into all the magnificence of nature!

1855

1855
Baxter

BAXTER, W. E. America and the Americans. Lond.: George Rutledge and Co. 1855. Pp. 225–226.

A day on Goat Island! Would that no stormy ocean separated us from the groves of arborvitae and forests of maple, which overhang the rapids and clothe the steeps! Would that every summer we could for a few short hours at least recline on its grassy banks, watching the racing and eddying streams, listening to the growl of the cataract, and shaded by the foliage which waves and weeps over little channels between the rocks. There is one spot on it deserving special notice, near the beginning of the wilder rapids opposite the Canadian shore. A splendid vine, from which I plucked delicious grapes, and a red honeysuckle have there climbed to the very top of an arborvitae situated on a promontory, round which the water moans and bounds like a wounded tiger struggling to be free.

. . . . .

Swaying to and fro the awful pillar which shall rise in middle air from the base of the Horse Shoe Fall till time shall be no

more. A voice of thunder speaks to us from the abyss below; the shifting breeze blinds us with vapour; and another gust shows us Hesper glittering in the front of Heaven and heralding the night. 1855 Baxter

1870

ROBINSON, WILLIAM. (Description of Niagara.) (*In* N. Y. (state) survey — Special report for 1879. Albany, N. Y.: Van Benthuysen. 1880. Pp. 28–29.) 1870 Robinson

This description of the Falls is quoted in this special report by Frederick Law Olmstead in his "Notes on the preservation of the Falls and the natural beauty of their surroundings." He credits it to the 1875 edition of Robinson's "Alpine flowers." This particular edition of Robinson's book was not accessible.

The noblest of nature's gardens that I have yet seen is that of the surroundings and neighborhood of the Falls of Niagara. Grand as are the collossal falls, the rapids and the course of the river for a considerable distance above and below possess more interest and beauty.

As the river courses far below the falls, confined between vast walls of rock — the clear water of a peculiar light-greenish hue, and white here and there with circlets of yet unsoothed foam — the effect is startlingly beautiful, quite apart from the falls. The high cliffs are crested with woods; the ruins of the great rock walls forming wide, irregular banks between them and the water, are also beautifully clothed with wood to the river's edge, often so far below that you sometimes look from the upper brink down on the top of tall pines that seem diminished in size. The wild vines scramble among the trees; many shrubs and flowers seam the high rocks; in moist spots, here and there a sharp eye may detect many flowered tufts of the beautiful fringed Gentian, strange to European eyes; and beyond all, and at the upper end of the wood-embowered deep river bed, a portion of the crowning glory of the scene — the falls — a vast cliff of illuminated foam, with a zone towards its upper edge as of green

1870
Robinson

molten glass. Above the falls the scene is quite different. A wide and peaceful river carrying the surplus waters of an inland sea, till it gradually finds itself in the coils of the rapids, and is soon lashed into such a turmoil as we might expect if a dozen unpolluted Shannons or Seines were running a race together. A river no more, but a sea unreined. By walking about a mile above the falls on the Canadian shore this effect is finely seen, the breadth of the river helping to carry out the illusion. As the great waste of water descends from its dark gray and smooth bed and falls whitening into foam, it seems as if tide after tide were gale-heaped one on another on a sea strand. The islands just above the falls enable one to stand in the midst of these rapids, where they rush by lashed into passionate haste; now boiling over some hidden swellings in the rocky bed, or dashing over greater but yet hidden obstructions with such force that the crest of the uplifted mass is dashed about as freely as a white charger's mane; now darkly falling into a cavity several yards below the level of the surrounding water, and, when unobstructed, surging by in countless eddies to the mist-crested falls below; and so rapidly that the driftwood dashes on swift as swallow on the wing. Undisturbed in their peaceful shadiness, garlanded with wild vine and wild flowers, the islands stand in the midst of all this fierce commotion of waters — below, the vast ever-mining falls; above, a complication of torrents that seem fitted to wear away iron shores; yet there they stand, safe as if the spirit of beauty had in mercy exempted them from decay. Several islets are so small that it is really remarkable how they support vegetation; one, looking no bigger than a washing-tub, not only holds its own in the very thick of the torrents above the falls, but actually bears a small forest, including one stricken and half cast-down pine. Most fortunate is it that these beautifully verdant islands and islets occur just above the falls, adding immeasurably to the effect of the scene.

1872

HOLLEY, GEORGE W. Niagara: its history and geology, incidents and poetry. . . . N. Y.: Sheldon. 1872. Pp. 125–128. 1872 Holley

In the preface the author tells us that the "greater part of the historical narrative was read before the Buffalo Historical Society in February 1871; and the geological portion with some modifications, before the American Association for the Advancement of Science in August of the same year"

Previous to the war of 1812, the Niagara river abounded in swans, wild geese and ducks. Since that war none of the former have been seen here, except two pairs which came at different times. One of each pair went over the Falls and was taken out alive but stunned. The other two, faithful unto death, were shot while watching and waiting for the return of their mates.

Eagles have always been seen in the vicinity, and a few have been captured. A single pair for many years had their eyrie in the top of a huge dead sycamore tree near the head of Burnt Ship Bay. It was interesting to watch the flight of the male bird when he left it and his brooding mate on a foraging expedition. Leaving the topmost limb that served as his home observatory, he swept around in a large horizontal circle, which formed the base of a regular spiral curve, in which he rose to any desired height. Then, having apparently determined by scent or sight, or by both, the direction he would take in a tangent, he sailed grandly off to the destined point. How grandly too, on his return, he floated on to his lofty perch with a single fold of his great wings, and sat for a few moments, motionless as a statue, before greeting his queenly mate. . . . The noble family, not liking the intrusion of their human neighbors, sought a new home some years since.

Before the war of the Rebellion, Niagara was rather a favorite resort of that general winged-scavenger, the crow, and at times, in what seemed to be a western emigration, they were very numerous. But after the first year of the war they entirely disappeared. Snuffing the battle from afar they turned instinctively to the

1872 Holley

bloody forage grounds of the south, and did not reappear among us until some years after the war had ended.

Large numbers of ducks formerly went over the Falls, but not for the reason generally assigned, namely, that they cannot rise out of the rapids. It is true that they cannot rise from the water while heading up stream. When they wish to do so, they turn down the current and sail out without difficulty. No sound and living duck ever went over the precipice by daylight. Dark, and especially foggy nights are most fatal to them. In the month of September, 1841, four hundred ducks were picked up below the Falls, who had gone over in the fog of the previous night. In two instances dogs have been sent over the Falls and survived the plunge. In November, 1836, a troublesome female bull-tarrier was put in a coffee sack, by a couple of men who had determined to get rid of her, and thrown off the middle of Goat Island bridge. In the following spring she was found alive and well about sixty rods below the Ferry, having lived through the winter on a deceased cow that was thrown over the bank the previous fall. In 1858 another dog, a male of the same breed, was thrown into the rapids, also near the middle of the bridge. In less than an hour he came up the Ferry stairs very wet and not at all gay. He was ever after a sadder if not a better dog.

The reason why the animals were not killed may be thus explained. From the top of the rapids tower the spectator gets a perfect view of the periphery of the Canadian Fall. If he will, on a bright day, look steadily at the bottom of the Horse-Shoe where water falls into water, he will see, as the spray is occasionally removed, a beautiful exhibition of water cones apparently ten or twelve feet high. These are formed by the rapid accumulation and condensation of the falling water. It pours down so rapidly and in such quantities that the water below, so to speak, cannot run off fast enough and it piles up as though it were in a state of violent ebullition. These cones are constantly forming and breaking. If any strong animal should fall on to one of these cones as on to a soft cushion it might slide safely into the

current below. The dogs were doubtless fortunate enough to fall in this way, aided also by the repulsion of the water from the rocks in the swift channel through which they passed. It is not impossible that some strong man in a light, strong boat may thus, at some future time, go over the Horse-Shoe Fall and not be killed. 1872 Holley

1879

[1] New York state survey. Special report on the preservation of the scenery of Niagara Falls, and fourth annual report on the triangulation of the state for the year 1879. James T. Gardner, Director. Albany: Charles Van Benthuysen and Sons. 1880. Pp. 27–31. 1879

These valuable notes on the natural beauties of Niagara with some account of its varieties of vegetation are by Frederick Law Olmsted.

I have spoken of the *distinctive* charms of Niagara scenery. If it were possible to have the same conditions detached from the falls (which it is not, as I shall show), Niagara would still be a place of singular fascination; possibly to some, upon whom the falls have a terrifying effect, even more so than it is now.

Saying nothing of the infinitely varied beauties of water and spray, and of water-worn rock, I will, for a purpose, mention a few elements which contribute to this distinctive charm.

The eminent English botanist, Sir Joseph Hooker, has said that he found upon Goat Island a greater variety of vegetation within a given space than anywhere in Europe, or east of the Sierras, in America; and the first of American botanists, Dr. Asa Gray, has repeated the statement. I have followed the Apalachian chain almost from end to end, and traveled on horseback, "in search of the picturesque," over four thousand miles of the most promising parts of the continent without finding elsewhere the same quality of forest beauty which was once abundant about the falls, and which is still to be observed in those parts of Goat Island where the original growth of trees and

[1] A full account of the contents of this survey will be found in chapter XI.

1879 shrubs has not been disturbed, and where, from caving banks, trees are not now exposed to excessive dryness at the root.

Nor have I found any where else such tender effects of foliage as were once to be seen in the drapery hanging down the wall of rock on the American shore below the fall, and rolling up the slope below it, or with that still to be seen in a favorable season and under favorable lights, on the Canadian steeps and crags between the falls and the ferry.

All these distinctive qualities,— the great variety of the indigenous perennials and annuals, the rare beauty of the old woods, and the exceeding loveliness of the rock foliage,— I believe to be a direct effect of the falls, and as much a part of its majesty as the mist-cloud and the rainbow.

They are all, as it appears to me, to be explained by the circumstance that at two periods of the year when the northern American forest elsewhere is liable to suffer actual constitutional depressions, that of Niagara is insured against like ills, and thus retains youthful luxuriance to an unusual age.

First, the masses of ice, which, every winter are piled to a great height below the falls, and the great rushing body of ice-cold water coming from the northern lakes in the spring, prevent at Niagara the hardship under which trees elsewhere often suffer through sudden checks to premature growth; and, second, when droughts elsewhere occur, as they do, every few years, of such severity that trees in full foliage droop and dwindle, and even sometimes cast their leaves, the atmosphere at Niagara is more or less moistened by the constantly evaporating spray of the falls, and in certain situations frequently bathed by drifting clouds of mist.

Something of the beauty of the hanging foliage below the falls is also probably due to the fact, that the effect of the frozen spray upon it is equivalent to the horticultural process of " shortening in "; compelling a denser and closer growth than is, under other circumstances, natural.

1880

SAVAGE, JAMES. The whistling swan on Niagara river. (Bull. of the Buf. Soc. of Nat. Sci. 9: No. 1, 23–28.) 1880 Savage

The Whistling Swan, *Olor columbianus*, is a rare migrant along Niagara River. It may be said to occur regularly about the middle of March and casually in the fall. Its capture however would scarcely be possible were it not for its proneness to float down the river to injury or death at Niagara Falls.

I am told by observers living at Niagara Falls in a position to know, that scarcely a year passes without one or more swans being sacrificed at the Cataract. In March, 1906, about a score made the fatal plunge and in the same month, 1907, five were taken but no such catastrophe in the swan world has ever been described as that which happened on March 15th, 1908, when more than one hundred of these majestic birds, journeying toward their summer home near the Arctic Circle, came to an untimely end.

A severe rain-storm accompanied by thunder and lightning prevailed during the greater part of that day (March 15, 1908). About eleven o'clock in the morning, between showers, William LeBlond of Niagara Falls, Ontario, was engaged in removing from the ice bridge a temporary structure that had been used during the winter " season " as a souvenir and refreshment stand, when he was startled by a loud cry. Turning around, his attention was first attracted to a swan struggling in the water at the upper edge of the ice bridge, but on looking toward the falls he saw a great company of swans in distress coming toward the bridge. The scene that followed was a sad one for any bird lover to contemplate.

These splendid birds, helpless after their terrible plunge over the cataract, were dashed against the ice bridge by the swift current, amid cakes of loose ice which were constantly coming down from the upper river. Some had been killed outright by the falls. Others, unable to fly because of injury to their wings,

1880
Savage

attempted to stem the rushing waters, but here their wonderful swimming powers were of no avail. They were soon imprisoned in the ice where their pitiful cries were heart-rending.

The game laws of Ontario still permit the taking of geese and swan in the spring until April 30th and it was not long before men and boys, armed with guns and sticks, availed themselves of the privilege and became the chief factors in the closing scene of Nature's great tragedy;— the sacrifice of the swans.

The news of a " Great Slaughter of Wild Swan " appeared in the Buffalo newspapers on March 17th and the writer started for Niagara Falls forthwith to investigate the matter. As nearly as could be ascertained from interviews with various participants in the " slaughter " the number of swans taken on March 15th, was one hundred and two. Not all of these were taken on the ice bridge. A number were pulled out of Bass Rock eddy just below the power house of the Ontario Power Company and within 150 yards of the Horseshoe Falls.

On the morning of the 18th of March two more swan were taken at the ice bridge and a third was picked up alive on the shore at Bass Rock eddy. This latter bird I secured within a half hour after it was found and the picture shows it still in the arms of its captor. It was unable to stand on its feet or to use its wings and was taken in that condition to Buffalo and placed under the care of the curator of the Zoo in Delaware Park. It quickly recovered from its bruises and shock and now (March 25th) may be seen floating gracefully on Park Lake.

On March 22nd I went again to the Falls and saw five more swans that had just been taken by LeBlond while six had been picked up at Bass Rock eddy early that morning. Three others were seen in the gorge but were able to mount into the air and fly over the falls to the upper river. I went up the river to the historic village of Chippewa hoping to find a remnant of this swan brigade, but there was not one to be seen on the river below Navy Island. A flock variously estimated to number 20 to 60 individuals had been seen by a number of people the day before.

I was unable to learn that any swans had been shot above the falls although they had been seen there almost every day for a week. 1880 Savage

. . . . .

While it may be true that birds sometimes fly into the falls from the gorge below, I know that the swans in the present instance went over the precipice from the upper river. They were seen above the rapids before eleven o'clock on the morning of March 15th.

After a long tiresome flight from Chesapeake Bay the open water of Niagara River would be a welcome sight to this ill-fated flock of swans. Resting from their labors they probably drifted down stream unsuspecting danger until too late to save themselves from plunging into the turbulent waters of the Canadian Rapids. These rapids begin abruptly with a drop of about ten feet in a line running across the river from the head of Goat Island to the gate house of the Ontario Power Company on the Canadian shore. I have watched gulls float down over the crest and spring into the air from the descending water. "Swan being so large and heavy cannot easily take wing but are obliged to force themselves over the water against the wind, by rapid and powerful beats of the wings and feet until obtaining the requisite momentum, they are lifted into the air."[1] When they reach this line of breakers they are probably carried down and completely submerged, after which by reason of confusion or inability, they cannot fly but are rushed forward and a minute or two later are carried over the brink of the precipice and plunged 160 feet into the gorge below.

Swans are not the only waterfowl that are sacrificed at Niagara's shrine. On the occasion of my visit March 18th, I saw a handsome male Canvasback duck, *Aythya vallisneria* (Wils), come down against the ice bridge. It was unable to fly but succeeded in extricating itself from the moving ice and gaining a foothold on the bridge at a point where to attempt to

[1] "The wildfowl of the United States," by Daniel Girand Elliot.

1880
Savage

catch it alive would have been a perilous undertaking. Later in the day I saw an American golden-eye duck, *Glaucionetta clangula americana* (Bonap), struggle out of the foaming water below the Horseshoe Falls into Bass Rock eddy and with great difficulty reach the shore. It made no attempt to escape when picked up. While no external injury was apparent, it was unable to walk or fly. It recovered, however, from its shock by the time Buffalo was reached and when an opportunity was given, it flew off as strong as ever in the direction of the River.

Regarding the disposition made of all these swans which in the aggregate would approximate a ton in weight, I will say that the cygnets were nearly all selected at once for the table and many a tough old bird as well. A large number, however, have been preserved by the taxidermists of Niagara Falls and Toronto. Five fine specimens secured by Mr. Ottomar Reinecke are being prepared as a splendid group for the Museum of the Buffalo Society of Natural Sciences by its taxidermist, Herman Grieb. The latter reports that the stomachs of the birds examined by him were empty. One specimen, a female and not the largest, measured 51⅛ inches in length and 81 inches from tip to tip of its extended wings. I saw no less than 50 of these dead birds and looked them over carefully thinking that possibly there might be a Trumpeter Swan, *Olor buccinator* (Rich.), among them but none was found.

While the killing of the wounded swans at the ice bridge was technically lawful and in a certain light might be regarded as an act of mercy inasmuch as without human interference most of the birds would probably have perished from their injuries or by starvation, yet it is greatly to be regretted that as many of the birds as possible were not taken alive and given an opportunity to recover. I believe that fully one-third of the 116 swans taken would have survived if given the proper care. But the impulse to kill was stronger than the spirit to save and not even a pair of these unfortunate birds was rescued from nature's doom and restored to nature's freedom.

1882

DAY, DAVID F. The plants of Buffalo and its vicinity — Cryptogamae. (Bull. of the Buf. Soc. of Nat. Sci. 1882. 4: No. 4, 153–290.) 1882 Day

Crytogamae, pp. 152–250; "Tabular view of the flora of Buffalo and its vicinity," showing names of orders, number of genera, and the number of species and varieties, pp. 253–254; supplementary list of additional phaenogamae, pp. 255–269; index of generic names, of both phaenogamae and cryptogamae, pp. 271–279; general index for both, pp. 281–290.

DAY, DAVID F. The plants of Buffalo and its vicinity — Phaenogamae. (Bull. of the Buf. Soc. of Nat. Sci. 1882. 4: No. 3, 65–152)

The introduction is by Day and the map by Pohlman and Chandler. There is a numbered list, giving the locality of rare species.

It is quite certain that before the establishment of the Buffalo Society of Natural Sciences no one had undertaken to investigate the Flora of Buffalo and determine what plants it comprised.

It is true that at rare intervals some of the early botanists and collectors had visited our neighborhood. As long ago as 1749, Kalm, a contemporary and correspondent of Linnaeus, made an excursion to the Falls of Niagara, and, undoubtedly, collected some of the remarkable plants of that locality. In 1806, Pursh, the author of "Flora Americae Septentrionalis" (as we are informed in his preface) "traversed the extensive and highly interesting country of the Lesser and Great Lakes." In the following year, Michaux, the younger, while engaged in a botanical exploration in western New York, traveled from Batavia to Buffalo, recording some interesting observations respecting our primæval forest; and, some fifteen or twenty years later, Drummond and Douglass, distinguished botanical explorers, made collections of plants at Niagara. Unfortunately, however, only the scantiest and most unsatisfactory record reaches us of the labors

1882 Day

and discoveries of these pioneers of botanical science in this vicinity.

Probably the earliest botanist who had a permanent residence in Buffalo, was Dr. John A. Kinnicutt:— in 1828, one of the physicians of the village. In "The Flora of the State of New York," Torrey makes acknowledgment of having received from Dr. Kinnicutt some of our more notable plants; but, aside from this brief mention, we have no account of his botanical labors.

Upon the organization of the Buffalo Society of Natural Sciences, in December, 1861, a Committee on Botany was appointed, consisting of the Hon. George W. Clinton, the Society's first President, Dr. Charles C. F. Gay, and the compiler of the present Catalogue. In the spring of 1862, the committee began an investigation of the Flora of Buffalo and the formation of an Herbarium, for its illustration. At the close of the year 1863, two seasons having been spent in the field, the Committee had detected and identified 936 species, or well-marked varieties, of phaenogamous plants. A list of these, and of 40 species of vascular cryptogams, which had also been collected, was prepared by Judge Clinton and published in the spring of 1864.

The investigation thus begun, although not always prosecuted with the assiduity which at first characterized it, has never since ceased. At the present time the plants which have been collected in our region, and of which specimens are contained in the Herbarium of the Society, amount to not less than 2800 species. It is confidently believed that except in the lower orders of the *Cryptogamae*, the number of species belonging here, and which still remain to be discovered, is comparatively small. Hence, the Society has deemed the present time a proper one to give to the botanical world a Catalogue of "The Plants of Buffalo and its Vicinity." . . .

The Catalogue presents the name of all the plants which have been detected within a radius of fifty miles of Buffalo and satisfactorily identified. . . .

The altitudes of many of the places named in the Catalogue have been indicated upon the map which accompanies it. It is supposed that these will prove of no little interest. The statement that in respect to the growth of plants a higher elevation is epuivalent to a higher latitude here meets with some note-worthy confirmations. . . . 1882 Day

The table, which is appended to the Catalogue, is designed to show, at one view, the number of genera and species in the several classes and orders of plants represented in our Flora. . . .

It would be very far from the truth to assert that the entire territory included within the limits of fifty miles from Buffalo has been fully explored, and all its floral treasures brought to light. Much of Wyoming and Genesee counties remains to be examined. Except near Niagara River very little has been done in the Ontario District. In that part of the Erie District which lies west of Niagara River many localities remain to be investigated. But it is very safe to say that all our characteristic flowering plants and all our more abundant cryptogams are named in the Catalogue. The species hereafter to be detected within our limits will probably be found in scanty numbers and inhabiting very narrow bounds.

The naturalized plants of Buffalo are a large and increasing number. In accordance with usage their names appear in the Catalogue in small capitals. . . .

(Collection and listing of lichens by Miss Mary L. Wilson.)

(Algae by Prof. David S. Kellicott, of the State Normal School, of Buffalo.)

(Lists of Musci, Hepaticae and Fungi supervised and edited by Charles H. Peck, of Albany, State Botanist.)

(Map by Julius Pohlman, custodian of the Society, and Henry Chandler of Buffalo.)

[Plants known to have existed here formerly included, but not numbered. Locality indicated where not of general diffusion.]

A word may be of use in explanation of the nomenclature adopted in the Catalogue. As a rule, the names of the species

1882 Day

are those employed by Watson, in his " Bibliographical Index to North American Botany," so far as that valuable work has issued from the press. But where such names differ from those given by Gray, in the fifth edition of his Manual, the latter will be found in parentheses. In a very few instances the compiler has ventured to differ from both of these pre-eminent authorities, and has used the names applied by other botanists.

The fact is entitled to notice that now, probably for the first time in America, a local catalogue is published in which the plants of all the classes in the vegetable kingdom are included. Usually, heretofore, such catalogues have not extended beyond the Vascular Cryptogams:— very rarely, indeed, have they comprehended the Musci and Hepaticae.

. . . Of the 1,295 species and varieties of phanogamous plants, now enumerated as belonging to Buffalo and its vicinity, 1,011 are indigenous to the soil, and 284 have been introduced, inadvertently or by design. [Page 256.]

1887

1887 Day

DAY, DAVID F. A catalogue of the flowering and fern-like plants growing without cultivation in the vicinity of the Falls of Niagara. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. 1898. 14:61–134.)

A reprint of the catalog which appeared in the *Fourth Annual Report.*

DAY, DAVID F. Catalogue of the Niagara flora. A catalogue of the flowering and fern-like plants growing without cultivation in the vicinity of the Falls of Niagara. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. 1887. 4:67–133.)

This catalog was prepared in response to the request of the Commissioners of the State Reservation.

It is, however, a matter for great regret that references to the botany of the Falls, especially in the reports of the earlier explorers, have proved so few in number. It seems probable that Peter Kalm, the friend and correspondent of the great Linne,

left some record of the botanical observations, which he made during his visit at Niagara, in the year 1750. But, the author has failed to find any mention of its publication, either in the Swedish tongue or in an English translation. If his journal still exists, its publication, at the present day, could not but be welcomed as an important contribution to the literature of American botany. It seems not unlikely that the species of *Hypericum* and *Lobelia*, which bear his name, were discovered by him near Table Rock. It is to be doubted whether either the elder or the younger Michaux visited the neighborhood of the great cataract, and it is certain that the enterprising spirit of Pursh brought him no nearer than the site of the present city of Elmira. Nuttall, who botanized near the Falls sometime previous to the year 1818, mentions but one plant, *Utricularia cornuta*, as found by him in their vicinity. Torrey doubtless visited the region — possibly was familiar with it — yet, in his Flora of the State of New York, published in the year 1843, of the 1,511 species of plants, which he described, only fifteen are attributed to Niagara, and none of these, upon his own authority. In the *Flora of North America*, of Torrey and Gray, published in 1838–1842, Niagara is mentioned as a station only five times. 1887 Day

The labors of later botanists have been far more useful in the preparation of the list. The MS. journals of the Hon. George W. Clinton, while engaged in his arduous labors upon the botany of Buffalo and its vicinity, have proved of the greatest value; and the "*Flore Canadienne*" of Abbe Provancher and the "*Catalogue of Canadian Plants*" of Professor Macoun, the learned and indefatigable botanist of the Canadian Geological Survey, and the "*Canadian Filicineae*," the joint work of Professor Macoun and Dr. Burgess, of London, Ontario, have been of important service.

1887 Day

The flora of Goat Island presents few plants which may be called uncommon in Western New York. For the rarer plants, included in the Catalogue, other localities must be visited. But it is still true that Goat Island is very rich in the number of its species. Probably no tract of land in its vicinity, so restricted in area, can be found, exhibiting so large a number. Its vernal beauty is attributable, not merely to its variety of plants, conspicuous in flower, but also to the extraordinary abundance in which they are produced. Yet it seems likely that there was a time, probably not long ago, when other species of plants, of great beauty, were common upon the island, but which are not now to be found there. It is hardly possible that several orchidaceous plants and our three native lilies did not once embellish its woods and grassy places. Within a little while the Harebell (*Campanula rotundifolia*, L.), has gone and the Grass of Parnassus (*Parnassia Caroliniana*, L.), is fast going. This is undoubtedly due to careless flower-gatherers, who have plucked and pulled without stint or reason. The same fate awaits the *Sanguinaria*, the *Diclytras* and the *Trilliums*, which do so much to beautify the island, unless the wholesale spoliation is soon arrested.

. . . . .

Thus, it may be mentioned that in the wooded grounds adjoining De Vaux College and belonging to that institution, there may be found *Rhus aromatica*, Ait., *Liatris cylindracea*, Michx., *Aster ptarmicoides*, T. and G., *Asclepias quadrifolia*, Jacq., and *Morus rubra*, L. Among its rocks, perhaps there may still be found a specimen of *Pellaea atropurpurea*, Link., *Camptosorus rhyzophyllus*, Link., and *Asplenium Trichomanes*, L. The Devil's Hole, now almost inaccessible, was once a paradise of ferns — *Phegopteris Dryopteris*, Fée, being its chief rarity. The plateau of rock, which overlooks the ravine, produces *Arabis hirsuta*, Scop., and *Selaginella ruprestis*, Spreng., elsewhere in this region quite uncommon. Between the "Mountain" and Lewiston, the explorer will find *Rannunculus multi-*

fidus, Pursh., *Xanthoxylum Americanum*, Mill., *Houstonia* 1887
caerulea, L., and *Asplenium ebeneum*, Ait., rare plants in Day
western New York. Queenston Heights have yielded us *Anemonella thalictroides*, Spach., *Asimina triloba*, Dunal, *Lupinus perennis*, L., *Frasera Carolinensis*, Walt. and *Celtis occidentalis*, *L.*,— species scarcely found elsewhere in our vicinity. Of Foster's Flat, above Queenston, it may be said that the spring seems to visit its rocky fastnesses some weeks earlier than the table-land above. Among its uncommon plants, it may be mentioned that Professor Macoun and Dr. Burgess have detected *Aspidium Lonchites*, Swartz, and *Aspidium Bootii*, Tuckm.,— ferns whose accustomed range is a hundred miles northward. The woods near the whirlpool, on the Canadian side, produce in abundance *Cerastium arvense*, L., *Arctostaphylos Ura-ursi*, Spreng., *Castilleia coccinea*, Spreng., and the only sassafras trees known in the neighborhood of the Falls. The low land, near Clifton, on the Canadian side, only a few inches higher than the river, affords such uncommon plants as *Gentiana serrata*, Gunner, and *Parnassia Caroliniana*, Michx., *Calamintha Nuttallii*, Benth., still grows on the damp rocks, near the border of the river, and *Gerardia purpurea*, L., and *Utricularia cornuta*, Michx., appear sparingly in the wet and oozy soil near by.

. . . . .

Of the 909 species of plants named in the Catalogue, 758 are native and 151 foreign.

DAY, DAVID. Catalogue of the Niagara flora. A catalogue of the flowering and fern-like plants growing without cultivation in the vicinity of the Falls of Niagara. (Troy:) The Troy Press. 1888.

1889

PANTON, J. HOYES. Flora of Queen Victoria Niagara Falls park. 1889
(Ann. rep'ts of the com'rs for Queen Victoria Niagara Falls park. Panton
1889. 4:17–31.)

A partial list, comprising "71 orders, 261 genera, and 458 species," by the professor of natural history and geology at Ontario Agricultural College.

1892

1892 Chamberlin

CHAMBERLIN, JOHN. (Letter to editor by John Chamberlin of Buffalo on "The Niagara Reservation" and its remarkable and various plant life.) (Garden and forest, Nov. 30, 1892. 5:575.)

To the Editor of Garden and Forest:

Sir,— The botanist who visits Niagara Falls is constantly attracted away from the striking features of the river and cataract to admire the remarkable development and variety of the plant-life that is everywhere manifest. Especially is this true on Goat Island, which is now one of the few spots in this vicinity that are covered with primeval growth. It is probable that even here the earlier timber has been removed, for that which remains is not very large, but the absence of stumps shows that no cutting of trees has taken place for a long time. The timber is chiefly of the ordinary hard-wood trees, Beach and Maple predominating, with an occasional Oak, Ash or Tulip-tree, and near the paths many small Cedars, white and red, Hemlock and prostrate Yew-bushes.

The long period of neglect which preceded the erection of the Falls into a state reservation was favorable to wild growth, and it is the avowed plan of the present management not to "improve" the locality more than the necessities of travel require, still there is evidence this year more than ever before that the gardener is at work here and there, and may sometime enter upon a warfare against the wonderful wild growth of Goat Island. It is at the close of a fall like this one that the region is most attractive. Up to the last week in October not a leaf had been touched with frost. Though not so brilliant in hue as autumn leaves become under frost, the yellow hues were everywhere, and in great variety, while the Sumachs, which form a grove on the south-east of the island that is striking at any season, do not wait for frost, and produce reds and yellows that are fairly flaming.

It may be said almost literally that no wild plant known hereabout is lacking to the flora of Goat Island, and especially is this true of plants of the more wayward and vagrant tendencies. In

few other places does the Wild Grape climb so high or spread so far or swell itself into such tree-like proportions. Nowhere, especially on the American side and in the vicinity of Luna Island, is the visitor out of sight of these rampant vines. The slope leading down to Luna Island is covered with small trees so overgrown by vines that one wonders how the trees can grow at all, yet they appear to thrive under the load. 1892 Chamberlin

If the Grape-vines are without fruit this fall, it is not the case with other wild plants on Goat Island. The Virginia Creeper, Bitter Sweet, Waahoo and Barberry are purple, yellow and scarlet with berries, and grow as though this were their chosen home of all the earth. The Barberry here, especially, illustrates the tendency of certain plants to keep away from cultivation. By far the finest specimen on the island hangs so far below the Luna Island stair-landing that it is unsafe to try to gather the rich clusters of scarlet berries, while a bush on the roadway that has been planted and given some cultivation is far less vigorous and seldom bears more than one or two berries on a single stem. The largest Bitter Sweet clusters hang far over the western bank, growing in very indifferent soil, and the Waahoo is best content where left entirely to itself.

. . . . .

1894

CAMERON, RODERICK. Catalogue of plants which have been found growing without cultivation in the park and its outlying territories. . . . (Ann. rep'ts of the com'rs for the Queen Victoria Niagara Falls park. 1894. 9:app.) 1894 Cameron

A list of " 105 families, comprising 417 genera and 915 species," compiled by the chief gardener of the park.

GUEST, *Lady* THEODORA. A round trip in North America. . . . Lond.: Edward Stanford. 1895. Pp. 187–194. 1894 Guest

The author was interested in sketching and went about to various points of view at the Falls but does not give much description of what she saw. She thinks Niagara a " marvellous mass of water, but that it has no other advantage; not fine scenery, no fine weather and no fine flowers."

1894 Guest

I thought these acres of cascades and rapids even more astonishing than the actual falls; which pictures and panoramas have given me an idea of; but I had no conception of a river resembling repeated shores of an angry sea.

These sister islands were fascinating. Little rocky paths wound about them, bordered with Maple, Balsam, Mulberry and Black Walnut trees, as green and fresh as possible, though there were not many flowers. Pink Crane's bill, the inevitable Dandelion, a bright scarlet Columbine, and Podophyllum, whose large leaves make the children call it the umbrella plant, were nearly all I noticed. On Goat Island is a considerable growth of sumach.

1895

1895 Cameron

CAMERON, RODERICK. Catalogue of plants which have been found growing without cultivation in the park and its outlying territories. . . . (Ann. rep'ts of the com'rs for the Queen Victoria Niagara Falls park. 1895. 10:app.)

A more complete list than that in the ninth report, but not exhaustive, since only such plants as had been mounted and were actually on evidence in the herbarium were included. The whole number consisted of " 107 families, comprising 487 genera and 1,101 distinct species."

1901

1901 Day

DAY, DAVID F. The flora and fauna of Niagara Falls. (The Niagara book. N. Y.: 1901. Pp. 158–177.)

The traveller, who seeks for exhibitions of the grander forces of nature, will find his wishes abundantly gratified at Niagara. The fall of the waters of one of the greatest rivers of the world over a precipice of more than one hundred and fifty feet in height, and the constantly growing record of their power to channel through the enduring rock, will prove to him an absorbing, yet perplexing, subject for study. But the tourist, who takes enjoyment in the shadows of a forest, almost unchanged from its natural condition, in the stateliness and symmetry of individual trees planted by the hand of Nature herself, in the beauty and

General View of Niagara

Early German print of a date after 1818 and based on one by Milbert

fragrance of many species of flowers growing without cultivation and in countless numbers, in the ever-varying forms and hues of foliage, and in the continually shifting panorama of the animated creation so near the scenes of human activity and occupation and yet so free from their usual effects, will find upon the borders of the river, within its chasm and on the islands which hang upon the brink of the great cataract, an abundant gratification of his taste and an exhaustless field for study. 1901 Day

To such a person — to all, in fact, who realize how ennobling it is to the heart of man to be brought at times face to face with Nature, whether in her beauty or her sublimity — it must always be the source of profound satisfaction to know that by the wise and liberal policy of the State of New York and the Dominion of Canada so large an area of country contiguous to the river and the Falls has been made a public property, and, placed forever beyond the reach of vandal hands, is now dedicated, for all time, to the highest and most exalted purposes.

Although in this volume a chapter has been devoted to the geology of Niagara, by one abundantly qualified for the task, nevertheless, for a proper presentation of the Natural History of the Falls and of the region of which it is the centre, a passing glance should here be bestowed upon the geological record of Goat Island and the river within whose embrace it lies, to bring out more clearly the relation to it of its Fauna and Flora. For this purpose it is not necessary to explore the measureless periods of time in which the imagination of the geologist is accustomed to range at will. It is demonstrable that in a scientific sense the Island itself is of a trifling antiquity. In fact it would be difficult to point out in the western world any considerable tract of land more recent in its origin.

There is every evidence to believe that the Niagara River has excavated its enormous chasm since the close of the period known to geologists as the Glacial Age. Whether before the coming on of the Glacial Age the upper lakes were connected or not with Lake Ontario (a proposition which seems to be well received in

1901
Day

the geological world), it seems very certain that thereafter Lake Erie, Lake Huron and Lake Superior sent their waters to the sea through an outlet which Lake Michigan then had into the Mississippi. A barrier not greater than fifty feet in height would suffice, even to-day, to reverse the current of Lake Erie and Lake Huron and compel the discharge of their contents into the Mississippi, either by reopening the old, abandoned channel at the head of Lake Michigan or by forming a new one. The barrier, which was broken down at the time, when in fact the physical history of the Niagara River began, may be pointed out with reasonable certainty to-day. A ridge near the foot of Lake Erie, which at one time extended in an eastward and westward course, crossing the present channel of the Niagara River, was that barrier. On either side of the river it attains a height of sixty or seventy feet above the present level of Lake Erie. It is almost unnecessary to say that this barrier was of glacial origin — an immense moraine. From its base, on the northerly side, to the verge of the cliff at Lewiston and Queenston, where the cataract began its work of erosion, the surface of the underlying rock rises steadily. At the summit of the cliff at Lewiston and Queenston, it has an elevation of thirty-two feet above the present level of Lake Erie.

It is fair to assume that although the lake (or river), after its irruption through this barrier, spread widely, yet that the beginning of the excavation of the chasm at Lewiston was not long delayed.

Along the entire length of the river from Lake Erie to Lewiston and Queenston, the terraces left by the river, as from time to time it deepened and narrowed its channel, may be easily recognized. Often they show evidence that they were formed at the bottom of the river before the chasm had been excavated, being very largely composed of water-worn stones and materials, brought and deposited by the river itself from more southerly localities.

Goat Island is of this origin. It is in fact a portion of such a terrace. In a single place upon the island there is to be seen a small quantity of clay, possibly deposited by the glacier where it is found, but more likely to have been brought by the current of the river along with the other materials which make up the soil. Mixed with the soil of Goat Island and with that of the river terraces in other places, there may be seen an abundance of the half-decomposed remains of fluviatile and lacustrine Mollusca — shell-fish, univalve, and bivalve, identical in species with those still living in the lake and river. 1901 Day

The period which has been employed by the river in the excavation of the chasm below the Falls, has, for more than half a century, been a most interesting study for the geologist. As early as 1841, Sir Charles Lyell, preëminent in his day as a geologist, from such data as he was then able to command, computed the time necessary for the work at no less than 35,000 years. Later geologists have sought, but unsuccessfully, to reduce the period. When, however, the island appeared above the river, substantially as it now is, presents a more difficult problem; but that the deposit of the materials of which its soil is composed, began as soon as the irruption of the river through the moraine, at the foot of Lake Erie, was accomplished, can scarcely be doubted. That 35,000 years have passed since the shells found on the island and in the terraces on either side of the river were deposited, and that no specific difference is to be discovered between them and their existing representatives and progeny, are facts full of interest to the evolutionist.

A calcareous soil, enriched with an abundance of organic matter, like that of Goat Island, would necessarily be one of great fertility. For the growth and sustentation of a forest, and of such plants as prefer the woods to the openings, it would far excel the deep and exhaustless alluviums of the Prairie States.

For the preservation of so large a part of the native vegetation of the island we must be thankful to the policy of its former

1901 Day

owners, who, through so many years, kept it mainly in the condition in which Nature left it. To the naturalist, the hand of cultivation is often the hand of devastation. It has happily been spared, to a large extent, the ravage of the axe and plough, and from the still more complete spoliation which comes from the pasturage of horses and cattle. It would be very difficult to find within another territory, so restricted in its limits, so great a diversity of trees and shrubs — still more difficult to find, in so small an area, such examples of aboreal symmetry and perfection as the island has to exhibit.

From the geological history of the island, as has thus been told, it would be inferred that it had received its Flora from the mainland. This, no doubt, is true. In fact the botanist is unable to point out a single instance of tree, or shrub, or herb, now growing upon the island, not also to be found upon the mainland. But, as has been remarked, the distinguishing characteristic of its Flora is not the possession of any plant elsewhere unknown, but the abundance of individuals and species which the island displays.

There are to be found in Western New York about one hundred and seventy species of trees and shrubs. Goat Island and the immediate vicinity of the river near the Falls can show of these no less than one hundred and forty.

Of our trees producing conspicuous flowers, such as the Cucumber-tree (*Magnolia acuminata*) and the Tulip-tree (*Liriodendron tulipifera*), there are but few specimens in the vicinity of the Falls. Abbé Provancher found the former growing at or near Clifton, and one magnificent specimen of the latter may be pointed out on Goat Island. In the reforestation of the denuded portions of the island, due observance to the planting of these beautiful American trees should be had.

Four maples are represented upon the island: *Acer saccharinum*, *A. rubrum*, *A. dasycarpum* and *A. spicatum*. The first of these, the Sugar-maple, is perhaps the most abundant tree upon the island. Five species of Sumach (*Rhus*) grow upon

the island or along the margin of the river. Our native Plum (*Prunus Americana*) and two Cherries (*Prunus Virginiana* and *P. serotina*) belong either to the island or the mainland, the latter, the Black-cherry of the lumberman, attaining upon the island a wonderful development. Near the gorge of the river, on either side, but not upon the island, the Crab-apple (*Pyrus coronaria*) abounds, diffusing in the early days of June its unequaled fragrance upon the air. 1901 Day

Three species of Thorn (*Crataegus coccinea, C. tomentosa* and C. *Crus-galli*) are to be met with upon Goat Island, adding in May and June no small part to the floral magnificence of the season. Six species of Cornel, including the flowering Dogwood (*Cornus florida*); two Elders (*Sambucus Canadensis* and *S. pubens*) and six Viburnums (*V. Opulus, V. acerifolium, V. pubescens, V. dentatum, V. nudum*, and *V. Lentogo*), either on the island or the mainland, contribute greatly, in the spring and summer months, to enlarge and diversify the display.

To find the Sassafras one must go down along the river as far as the Whirlpool. He will there meet with it, but not in profusion, on either side of the river. Our other native laurel, the Spice-wood (*Lindera Benzion*), is to be found handsomely represented on Goat Island.

Two species of Ash, the white and black (*Fraximus Americana* and *F. sambucifolia*), are among the trees of the island, and are to be met elsewhere in abundance.

The only species of Linden or Bass-wood, which belongs to the vicinity, is the familiar one, *Tilia Americana.* It is plentiful upon the island, and of extraordinary size and beauty.

Of nut-producing trees the following occur:

The Butternut (*Juglans cinerea*), the Black walnut (*J. nigra*), the white Hickory (*Carya alba*), the hairy Hickory (*C. tomentosa*), the pig-nut Hickory (*C. porcina*) and the bitter Hickory (C. *amara*), the Beech (*Fagus ferruginea*), the Chestnut (*Castanea vulgaris*), the white Oak (*Quercus alba*), the

1901 Day

post Oak (*Q. obtusiloba*), the Chestnut-oak (*Q. Muhlenbergii*), the Bur-oak (*Q. macrocarpa*), the dwarf Chestnut-oak (*Q. prinoides*), the red Oak (*Q. rubra*), the scarlet Oak (*Q. coccinea*), the Quercitron-oak (*Q. tinctoria*), and the Pin-oak (*Q. palustris*).

Two species of Elm (*Ulmus Americana* and *U. fulva*), three Birches (*Betula lenta, B. lutea* and *B. papyracea*), one Alder (*Alnus incana*), six native Willows (*Salix nigra, S. lucida, S. discolor, S. rostrata, S. petiolaris* and *S. cordata*), and four Poplars (*Populus tremuloides, P. grandidentata, P. monolifera* and *P. balsamifera v. candicans*), are embraced within the Sylva of Niagara.

Of the cone-bearing family the number of species is not as great as might be expected. They are only six, distributed in five genera, as follows:

The White-cedar (*Thuja occidentalis*), the most abundant of the evergreens at Niagara; the Red-cedar (*Juniperus Virginiana*), unfortunately disappearing; the Juniper (*J. communis*), the American Yew or Ground-hemlock (*Taxus baccata v. Canadensis*), the White-pine (*Pinus Strobus*), and the common Hemlock-spruce (*Tsuga Canadensis*). The two last named species are not as plentiful upon the island as their beauty demands. They should be at once, and largely, replanted.

Of the herbs, producing showy flowers, which are to be found upon the island, the following may be mentioned, which by their profusion as well as beauty, make it in springtime and early summer a natural flower-garden, wild indeed, but wonderfully beautiful:

Our two Liverworts or Squirrel-cups (*Hepatica acutiloba* and *H. triloba*), scarcely distinguishable from one another, except by the leaf, but of an infinite variety of color.

The dioecious Meadow Rue (*Thalictrum dioicum*), more noticeable because of the peculiar beauty of its foliage than its conspicuousness of flower — it is as graceful as a fern.

The wild Columbine (*Aquilegia Canadensis*), to be found on the island, yet more abundantly along the chasm, where it displays its elegant blossoms of scarlet and gold, far beyond the reach of the most venturesome. 1901 Day

The May Apple (*Podophyllum peltatum*), a plant singular both in flower and leaf, but beautiful and always arresting attention.

The Blood-root (*Sanguinaria Canadensis*), a plant lifting up its large, clear white flower and its solitary leaf in the early days of spring.

Squirrel-corn and Dutchman's breeches (*Diclytra Canadensis* and *D. cucullaria*). Strange plants, but of great gracefulness and beauty. Abundant on the island early in May; the former species, rich with the odor of hyacinths.

Of the spring-flowering *Cruciferae* to be found upon the island, the following deserve to be mentioned as notable for their abundance and beauty: The Crinkle-root (*Dentaria diphylla*), the Spring-cress (*Cardamine rhomboidea, v. purpurea*), and the Rock-cress (*Arabis lyrata*).

As many as four violets abound upon the island and its vicinity, adding their charms to the beauty of the month of May — *Viola cuculata, V. rostrata, V. pubescens,* and *V. Canadensis,* the last, remarkable among the American species, for its fragrance as well as gracefulness.

The Spring-beauty (*Claytonia Caroliniana*), the large, native Cranesbill (*Geranium maculatum*), the Virginian Saxifrage (*Saxifraga Virginiensis*), the two Mitre-worts (*Tiarella cordifolia* and *Mitella diphylla*), the spreading Phlox (*P. divaricata*), the creeping Greek Valerian (*Polemonium reptans*), now rather rare; the American Dog-tooth, Violet, or Adder's-tongue (*Erythronium Americanum*), the large-flowered Bell-wort (*Uvularia grandiflora*), the Indian Turnip (*Arisaema triphylla*), and the two Trilliums (*T. grandiflorum* and *T. erectum*), add largely to the spring contingent of attractive and conspicuous plants.

1901
Day

Later in the season, one may find the shrubby St. John's Wort (*Hypericum Kalmianum*), and one of the most graceful species of Lobelia (*L. Kalmii*), each rejoicing in a damp situation, and each, quite probably, discovered at the Falls, by Bishop Kalm, nearly a century and a half ago, and introduced by him from that locality to the notice of the botanical world. The name of the discoverer of these interesting plants is worthily commemorated in those which the great Linnaeus bestowed upon them.

The summer time brings forward many attractive forms — the Grass of Parnassus (*Parnassia Caroliniana*), the Painted-Cup (*Castilleia coccinea*), an occasional lily, an orchid or two, but of no great beauty, the Hare-bell (*Campanula rotundifolia*), and a large array of annuals.

Nor is the autumnal Flora of Goat Island uninteresting. Golden-rods (*Solidago* sp.), Sun-flowers (*Helianthus* sp.), Star-flowers (*Aster* sp.), the Downy Thistle (*Cnicus discolor*), and, at last, the triumph of October and of the dying year, the shorn Gentian (*Gentiana detonsa*), its graceful blossoms as blue as the summer skies.

In the region of the Falls, but not upon Goat Island itself, some plants of great beauty have been detected. Below the Whirlpool, two species of Bluets or Innocence (*Houstonia caerulea* and *H. purpurea*) are to be observed, the rare *Liatris cylindracea*, *Apocynum androsaemifolium*, the orange-colored Milkweed (*Asclepias tuaerosa*), the Fire-lily (*Lilium Philadelphicum*), the large, yellow Lady's Slipper (*Cypripedium pubescens*), the beautiful, low-growing Morning Glory (*Convolvulus spithamaeus*), and wild Roses, as fragrant as beautiful.

The ferns of Goat Island and the region of the Falls are numerous. Among them may be mentioned: The Ostrich-fern (*Onoclea Struthiopteris*), the Sensitive-fern (*O. sensiblis*), the Royal-fern (*Osmunda regalis*), the Interrupted-fern (*O. interrupta*), the Cinnamon-fern (*O. cinnamomea*), the Bladder-fern

(*Cystopteris bulbifera*), Shield-ferns of various species (*Aspi-* 1901
dium Noveboracense, A. Thelypteris, A. spinulosum, A. crista- Day
tum, A. Goldianum, A. marginale, A. Lonchitis), and the Christmas-fern (*A. achrostichoides*); the Beech-fern (*Phegopteris Dryopteris*), only found at the Devil's Hole; the Walking-fern (*Camptosorus rhyzophyllus*), four Spleen-worts (*Asplenium Trichomanes, A. ebeneum*, abundant at Lewiston, *A. achrostichoides*, and *A. Filix-faemina*), scarcely to be excelled in grace by any species; two Cliff-brakes (*Pellaea gracilis* and *P. atropurpurea*), the Common-brake, world-wide in its distribution (*Pteris aquilina*); the American Maiden-hair (*Adiantum pedatum*), and the common Polypody (*Polypodium vulgare*), peering, in many places, over the edge of the chasm into the depths below.

Of the fauna of Niagara very much cannot be said. All the larger Mammalia, which abounded in the region whilst it was still the possession of the red man, have long since disappeared. It seems almost as though they could never have resorted, habitually, to Goat Island. The access to it of the elk, the red deer, the bear, the panther, the lynx, the fox, and the wolf, common enough in the neighborhood, must always have been difficult, and their return to the mainland almost impossible. At the present time the quadrupeds inhabiting the island are propably only three, the Black-squirrel, the Red-squirrel, and the Striper-squirrel or Chipmunk. These may be seen, almost any spring or summer day, disporting themselves, without regard to the presence of man, in their leafy coverts.

The birds affecting the island and the gorge are not to be distinguished, in species, from those of the mainland. But, as would be expected, environment makes some species rare and others plentiful. The Robin (*Turdus migratorious*), the Oriole (*Icterus Baltimore*), the Blue-bird (*Sialia Wilsonii*), and the Gold-finch (*Carduelis tristis*), find so much of their food supply in door yards and cultivated land, that they are to be seen less frequently upon the island, or within the gorge, than elsewhere

1901 Day

in the neighborhood. On the other hand, birds of the deep and silent woods, like the Vireos, Wilson's Thrush (*Turdus fuscescens*), the Wood-thrush (*Turdus mustelinus*), and the Catbird (*Mimus Carolinensis*), are almost always to be seen and heard in the vicinity of the Falls or river.

Birds of the crow family, such as the common Crow, the Purple Grackle, and the Bluejay were probably, at one time, plentiful; but they are now rarely seen, except as they are passing over from one side of the river to the other. Our common hawks may be included in the same remark.

Summer or winter, numerous gulls may be seen hovering over the river, between its high banks, below the Falls.

Late in the autumn, after other birds have taken their flight in the thick spray of the Red-cedars, great flocks of Cedar-birds (*Amphelis cedrorum*) are to be noticed, feeding socially upon the plentiful sweet berries of the tree. Probably they remain until the supply of food is exhausted.

The Bald-headed Eagle (*Haliaetus leucocephalus*) was once a frequenter of the region of the cataract, but is now seldom seen. Probably he has learned to be wary and not unnecessarily to expose himself to the aim of the collecting naturalist. But, however that may be, without doubt the waters below the Falls were once a favorite resort to him. He was a devourer of fish, and, although powerful of claw and pinion, he did not disdain to save his strength by feeding upon such as had been killed or stunned in their passage over the Falls.

Of the birds of our region, which seem to fear the presence of man, and therefore retire to the unfrequented woods, it may be said that they are really plentiful in the shady nooks and recesses with which the gorge of the river abounds. The naturalist who would wish to make them a study, can do so satisfactorily, if he will but enter the woods at the Whirlpool or at Foster's Flat and patiently and quietly await their appearance. It is hardly possible that such a retiring species as the Indigo-bird (*Cyanospiza cyanea*) will fail to reward his watchfulness, or

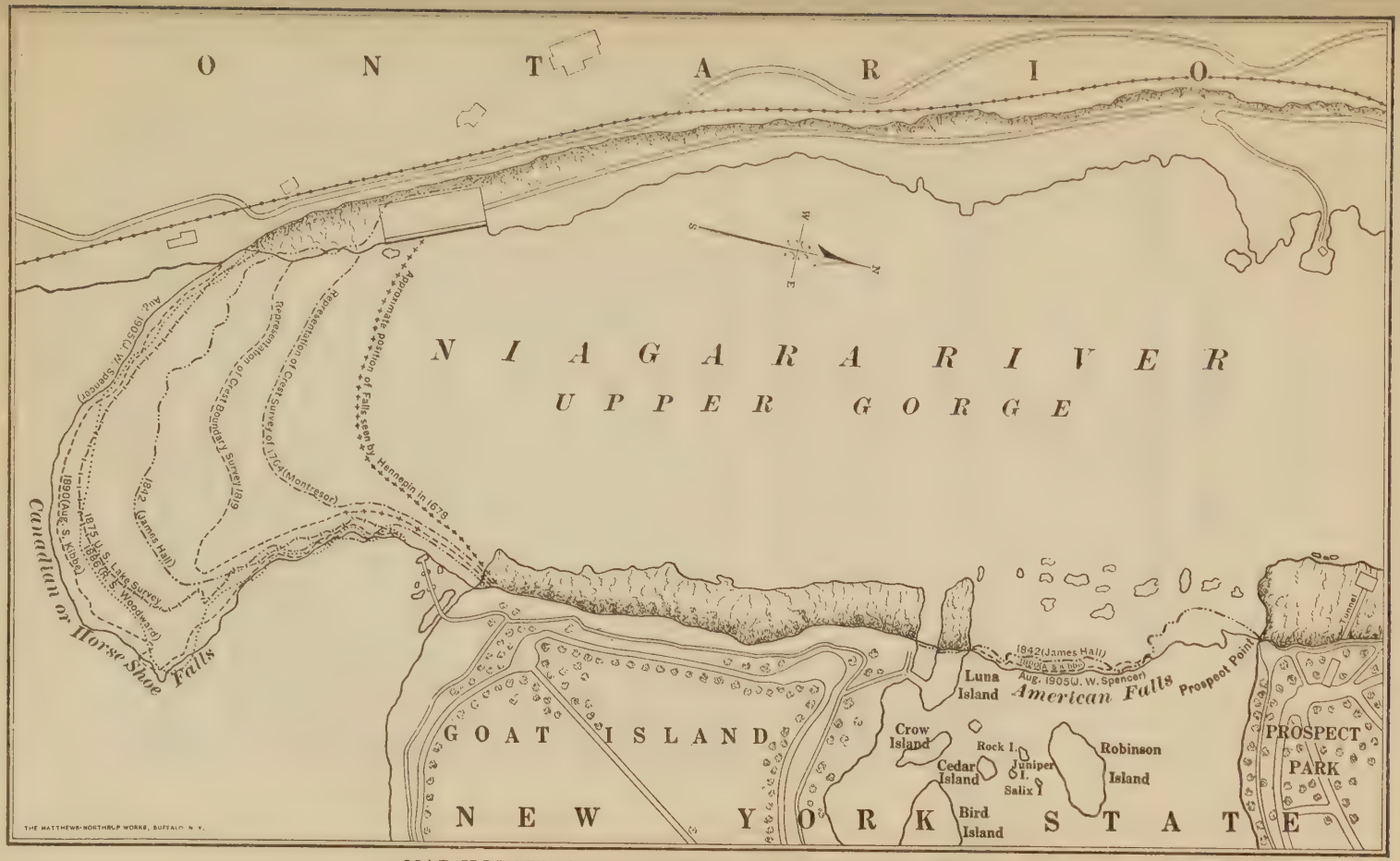
that a Scarlet Tanager (*Pyranga rubra*) will not soon flash like a meteor before his eyes. Likely enough the Kingfisher (*Ceryle Alcyon*) will leave his silent perch and with a harsh cry dart down upon his scaly prey. Here, where the thick leaves make a twilight, even at midday, the attentive ear of the student of our birds will listen, with delight, to the bell-like notes of the Wood-thrush or the sweet cadences of the Cat-bird's real song. 1901 Day

Summary

This chapter is the first to deal with Niagara in a special aspect. Probably a very large percentage of the visitors to the Falls are more impressed with the beauty and luxuriance of the vegetation than with any other feature excepting the cataract itself. Students of flora and fauna have been numerous among the visitors from the early days down to our time, but it is a curious fact that comparatively few of them have left any record of their visits in scientific literary form. Many of the early visitors were keen observers, and we are indebted to some of the more valuable general accounts for glimpses of the flora and fauna of the region as they found it. It is disappointing that Audubon's Journals, while they give us fine descriptive accounts of several of his visits to the Falls, do not put in a readable form the studies of bird life which he made there.

For our own time we are indebted to David F. Day for several articles on the flora and fauna of the Niagara region. Some of this work was undertaken at the instance of the Niagara Reservation Commission, and is valuable both for its history of the subject, and its bearing upon the present varieties of plant and animal life to be found at Niagara.

Chapter VII



MAP ILLUSTRATING RECESSION OF NIAGARA FALLS

Showing lines of brink of the falls at different dates

CHAPTER VII

SCIENCE, GEOLOGY AND PHYSICS

1789

McCAUSLIN, ROBERT. An account of an earthy substance found near the Falls of Niagara and vulgarly called the spray of the falls: together with some remarks on the falls. (Trans. Am. Philos. Soc. 1793. 3:17–24.) 1789 McCauslin

This paper was read before the American Philosophical Society on October 16, 1789. The author, who resided at the Falls from 1774 to 1783, was one of the earliest observers of the recession of the Falls. After describing the escarpment at Queenston he says:

It is universally believed that the cataract was originally at this ridge, and that it has by degrees worn away and broke down the rock for the space of these six or seven miles. Some have supposed that from these appearances, conjectures might be formed of the age of this part of the world. To enter upon such a calculation, it would previously be necessary to ascertain how much the fall had retired in a hundred years, or any other certain period. Suppose that we were even in possession of such a fact, still the conclusions drawn from it would be liable to the greatest uncertainty, as it is evident that the space of rock broke down and worn away in a certain number of years would not always be the same. The more or less hardness and brittleness of the rock in different parts; the greater or less severity of the frosts in different years; and the quantities of water that flowed at different periods in the cataract of the river, would all occasion considerable variations. This retrocession of the Falls does not by any means go on so quickly as some have imagined. During nine years that I have remained at Niagara, very few pieces of the

1789 McCauslin

rock have fallen down which were large enough to make any sensible alteration in the brink; and in the space of two years I could not perceive, by a pretty accurate measurement, that the North-East brink had in the least receded. If we adopt the opinion of the Falls having retired six miles, and if we suppose the world to be 5700 years old, this will give above sixty-six inches and a half for a year, or sixteen yards and two-thirds for nine years, which I can venture to say has not been the case since 1774.

1790

1790 Maclay

MACLAY, WILLIAM. Journal, ed. by Edgar S. Maclay. N. Y.: D. Appleton and Co. 1890. P. 190.

Under the date of February 1, 1790, the author records his impressions of Ellicott's account of the recession of the Falls.

Mr. Ellicott's accounts of Niagara Falls are amazing indeed. I communicated to him my scheme of an attempt to account for the age of the world, or at least to fix the period when the water began to cut the ledge of rock over which it falls. The distance from the present pitch to where the falls originally were, is now seven miles. For this space a tremendous channel is cut in a solid limestone rock, in all parts one hundred and fifty feet deep, but near two hundred and fifty at the mouth or part where the attrition began. People who have known the place since Sir William Johnson took possession of it, about thirty years ago, give out that there is an attrition of twenty feet in that time. Now, if 20 feet = 30 years = 7 miles, or 36,960 feet; answer, 55,440 years.

1796

1796 Priest

PRIEST, WILLIAM. Travels in the United States of North America, commencing in the year 1793, and ending in 1797, . . . Lond.: J. Johnson. 1802. P. 200.

In a letter dated December 29, 1796, the author tells of an American writer who "has been endeavoring to investigate the age of the world, from the *Falls* of *Niagara!* According to his calculation (which, by the way, is not a little curious) it is 36,960 years since the first rain fell

upon the face of the earth!" The author fails to tell us the name of this ingenious "American writer." 1796 Priest

VOLNEY, CONSTANTIN FRANCOIS CHASSEBOEUF, *Comte de.* A view of the soil and climate of the United States of America. . . . Tr. by C. B. Brown. Phil.: J. Conrad and Co. 1804. Pp. 80–94. 1796 Volney

A translation from the French original published in 1803. The author travelled extensively in America in the latter years of the eighteenth century. A large portion of his book is given up to the physical geography of the eastern section of the United States.

Some late travellers have considerably elucidated this surprising physical phenomenon; but as they have chiefly dwelt upon its influence, as a spectacle, upon the eye, and paid little or no attention to its topographical circumstances, of which the spectacle is merely an effect, I shall confine myself principally to the consideration of it in the latter view, in which it is by no means unworthy of attention.

It is surely a wonderful fact in geography, that a river, very near 2500 feet wide, and generally fifteen in depth, should find the level of its channel suddenly sink beneath its stream, and should throw down its entire mass of water, from a height of a hundred and forty-four feet, into a channel through which it pursues its subsequent course, where the spectator can discover no hill or ridge that could once have restrained or blocked up its passage. One cannot, at first, conceive by what position or direction of the surface nature has led to the production of this astonishing scene; but, when the process is discovered, we are equally astonished at the obvious simplicity of the means, and the grandeur of the end affected by them.

To enable the reader more clearly and distinctly to conceive this picture, we must remind him, that the country between Lake Erie and the Ohio is a vast plain, higher, in its general level, than almost all the rest of the continent, as is proved by the course of its rivers, some of which flow into the north Atlantic, and others into the Gulph of Mexico.

. . . On the northern side, having skirted Lake Erie, and

1796
Volney

approached within six or seven miles of Ontario, the level of this plain is suddenly lowered, and a new plain commences at the foot of the declivity, more than 230 feet below the former one, which forms the verge or table of Lake Ontario. In receding from the shore of the lake, we distinctly and easily perceive this change of level. At a distance, viewed from the lake, it appears like a lofty rampart, whose side is bristled with forests, and which seems to interdict all passage beyond it. If we enter the St. Laurence, and ascend as far as Queenstown, we presently perceive a deep and narrow chasm, from which flows the river, in a swift but unruffled course. The cataract still remains unexplained. This precipice stretches from Toronto, or even from a greater distance, and skirting the northern shore of Lake Ontario, at an interval of one or two miles, it makes a bend towards the east, on the southern shore of the lake, and crosses the river seven miles from its mouth. . . .

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The true mechanism of Niagara will not be so easily comprehended by those who approach it on the side of Lake Erie, in which direction I approached it, October 24th, 1796. From the lake, we have no mountain in view, except near Presque Isle, where some faint and remote ridges are seen, in the northwest quarter of Pennsylvania. The country traversed by the St. Laurence is a scene of continual forest, and the sluggish motion of the stream, scarcely at the rate of three miles an hour, affords no token of the direful commotion lower down. It is not till we reach the mouth of Chippeway creek, eighteen miles below Lake Erie, that the water assumes a quicker motion, and compels the boats to seek the shore, at a village built at this spot. Here the river expands into a sheet of water near two thousand feet wide, overshadowed on all sides by woods. Two miles and a half further is the fall. Our attention is at first awakened by a dull and rumbling sound, like the roar of a remote sea. This sound is lower or higher, according to the direction of the wind, but the eye as yet discovers nothing extraordinary. From hence we

pursue our way, on foot, through a rugged waggon road, on the left bank of the river, while the trees shut us out from all the scene before us. Having proceeded a mile, we perceive the river growing turbid and tumultuous, and, in another mile, it is entangled among rocks, which are covered with foam. Beyond these breakers, we behold issuing, as it were, from a chasm in the forest, a cloud of vapour, and this is the only token, as yet, of the river. The noise becomes now more violent, but the cataract is still unseen. We continue to proceed along the bank, which at first did not exceed the height of ten or twelve feet above the water, but which soon becomes twenty, thirty, or even fifty feet high, by which we may judge of the declivity thus far in the channel of the river. Some hollows oblige us here to make a circuit from the river bank, which we presently reach again, by crossing some newly enclosed fields, and emerging at length from the trees and bushes, we find ourselves along side of the cataract. We here behold the river fall in one sheet, twelve hundred feet wide, into a hollow or canal worn by the force of its waters, from a perpendicular height of about two hundred feet. It is hemmed in by two rocky walls, whose tops are crowned with firs, oaks, cedars, &c. The traveller usually surveys the fall from a spot where a jutting rock towers above the abyss. Some of my companions gave this spot the preference. Some others, whom I joined, were told that the descent to the bottom of the gulph, more than half a mile below, was practicable, by means of Simcoe's ladder, and thought we should enjoy the scene more completely, as objects of this kind are viewed most advantageously looking upward to them. We accordingly descended, not without difficulty, by a kind of stairs, which are nothing more than the trunks of trees, disposed conveniently, with notches cut in them, on the face of the declivity. Having reached the bottom, we re-ascended towards the fall by a ledge of broken rocks mixed with sand, where lay the bones and reliques of deer and other animals, who, in attempting to pass the stream above, had been borne down by its rapidity.

1796 Volney

1796
Volney

The current near us was extremely rapid, on a stony bed, but unaccompanied with danger. Upon our left, before us, was a portion of the fall, about two hundred feet wide. A small isle divides this from the great cataract. Beyond, and in front of the spectator, this fall moulds itself into the form of a horse-shoe, with an opening of about twelve hundred feet, shrouded on the right by rocks jutting out from the side of the chasm. For more than eighteen hundred feet round the spray fills the air, and descending in columns, wets the spectator to the skin.

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It remains for me to explain how the river extricates itself from the chasm. I pursued my way on foot, across the wood, by a steep path, for six miles. I was endeavouring to discover the outlet, when I suddenly lighted on the steep shelf before described. The Canadians denominate this place the *platon*, or platform. My view, here disembarrassed from the trees, suddenly glanced over a boundless horizon. On the north, Ontario stretched itself before me, like a sea; nearer lay an extensive meadow, through which the St. Laurence flows, in three sweeps or bends. Beneath me, and, as it were, at the bottom of a valley, the little village of Queenstown is seated, on the west bank of the river; while, on the right, the river finally issues as from a cavern, by an opening concealed by the woods from my view.

To those, who closely examine the situation of the scene, it is plain, that the fall commences here, and that it has sawed through the layers of the rock, and thus hollowed out its channel. The chasm has been gradually worn away, from age to age, till it reached the place where the fall now appears. This operation has continued slowly, but incessantly. The oldest settlers in the neighbourhood, as Weld relates, recollect a period when the bank of the fall was several paces forward. An English officer, stationed for thirty years at Fort Erie, states several facts, clearly proving, that the rocks existing there thirty years ago, are now undermined.

In the winter of 1797–8, the great thaw, and consequent floods, loosened great masses, which confined the course of the water. If the European colonists or travellers, to whom this region has been accessible for a century and a half, had made careful memorandums, from time to time, of the state of the fall, we should, by this time, have been able to trace the progress of those revolutions, which are easily proved to have taken place, by vestiges and indications which present themselves at every step. 1796 Volney

1804

BARTON, BENJAMIN SMITH. Description of the Falls of Niagara. (Phila. med. and phy. jour. Phila.: J. Conrad and Co. 1804. 1: pt. 1, pp. 39–47.) 1804 Barton

This account of the Falls, written in 1798, describes the formation of the Falls, the rapids and the vapors arising from the Falls, the sound, the dimensions and the scenery. The idea of the recession of the Falls is rejected with the statement that the "notion is extravagant," but the reasons advanced for this opinion seem feeble in the light of recent geological opinions. The author testifies to the popularity of the Falls in his time — "Many travellers of the first respectability from the United States and Europe have visited them this season."

1805

ROBERTSON, FELIX. Additional observations on the Falls of Niagara. (In Phila. med. and phy. jour. Vol. I, pt. II, pp. 61–68.) 1805 Robertson

In a letter, dated February 9, 1805, to the editor of the Philadelphia Medical and Physical Journal, Mr. Robertson gives a very clear and straightforward presentation of the essentials dealing with the original position of the Falls, a subject which had been previously discussed in that periodical.

SUTCLIFF, ROBERT. Travels in some parts of North America in the years 1804, 1805, & 1806. Phila.: B. & T. Kite. 1812. Pp. 149–155. 1805 Sutcliff

A very brief but illuminating view of the life of the people and the state of the country about the Falls. Figures on the height and width of the Falls are given, and the volume estimated at 3,000,000 tons. Some hearsay reports are given as to the distance — forty or fifty miles — at

1805 Sutcliff

which the sound of the Falls can be heard. No attempt is made to describe the Falls as such.

In riding along yesterday, a few miles from Buffalo Creek, I thought I could very distinctly hear the noise of the Falls of Niagara, although then about 24 miles from that stupendous cataract. The distance at which the people in these parts say the Falls may be heard, when the wind and other concurring circumstances are favourable, is almost incredible. I met with a reputable looking farmer . . . who told me, with all the gravity of a man speaking the truth, that he sometimes heard them very plainly at his residence, 40 miles distant from them; when the wind was favourable, or the air calm and serene. Last night I came to Crow's tavern in Buffalo Town, . . . Crow, the keeper of this inn, told me that in cold weather, or when the wind suited, the noise of the Falls was generally heard in Buffalo; which is a distance of 20 miles from them.

. . . . .

[At Chippewa] . . . the noise of them is so loud, that a person seems to be close upon them, although they are nearly three miles distant. I was informed by several of Fenning's family, that the concussion occasioned by the descent of so large a body of water, is such, that in a still summer's evening, a constant tremor of the earth is perceptible; and the loose glass in the windows is so shaken as to produce considerable noise.

. . . . .

I was informed by Joseph Ellicot and his brother, at whose house I lodged, that they had twice measured the falls, and found them to be 158 feet in height, and about 1800 yards in width from the opposite edges of the river. I was told by the ferryman, that about 16 miles above the Falls, the river was nearly one mile in width, and that, in the middle, it was 40 feet in depth; and, in common, the stream ran at the rate of six miles in the hour. If this is really the case, and I have no cause to doubt it, the quantity of water passing over the Falls, and continually suspended between the top and bottom, may be more

than 400,000 tons. If the additional weight and velocity, gained by a fall of 158 feet, be added, the weight of these prodigious columns of water would exceed three millions of tons. Such an enormous specific gravity falling at once into the gulph below, may bring the accounts of the Falls being heard, under favourable circumstances, at the distance of 40 or 50 miles, within the limits of credibility. 1805 Sutcliff

1809

MITCHILL, SAMUEL L. A summary of remarks made on the Falls of Niagara, by the Hon. Samuel L. Mitchill, as gathered from his conversations and display of mineral specimens. (The Portfolio, Sept. 1809. 2:231–237.) 1809 Mitchill

On exploring the strata laid bare by the cataract, their argillaceous, calcareous and silicious character immediately struck him. He was careful to bring away specimens of each; and these at all times and distances enable him to substantiate his own description of the grand falls.

The inferior layers of earthy matter at the falls are composed of slate, or shistus. This is very friable, and cracked into numberless pieces. It has so little cohesion that the fragments can be easily picked out by the fingers. It is constantly dropping off or wearing away. Its fallen portions constitute a part of the loose gravel through which the traveller labours beneath. This argillaceous matter yields to mechanical and chymical agency more readily than the harder strata which it supports. It therefore undergoes excavation, while the superior and firmer strata of limestone project and overhang until they break off by their own weight. Owing to this abrasion or decay of the brittle shistus, the calcareous rocks above jut far beyond their present base, and threaten him who takes shelter below them. Masses of various sizes, from small stones to rocks of many tons weight have fallen from the summit thus undermined, and now occupy the space at its foot. As the excavating or undermining process goes on, other pieces will be detached, and the chasm be proportionally enlarged. . . .

1809
Mitchill

The rocks which compress the layers of friable shistus at Niagara are limestone. They are piled up to a great height. They are disposed horizontally, and are of flat or tubular form. Their strength and compactness enables them to overhang the banks, after their foundation of brittle slate has been removed. One of the most prominent and durable of these strata is the table-rock. . . . And it may be regretted, that it will be spoiled whenever the slate beneath shall so far be worn away as to render the incumbent strata of calcareous matter incapable of supporting their own weight. The projecting portions will break off, and descend by their gravity to the subjacent mass of ruins. . . .

In these calcareous strata, Dr. Mitchill observed the carbonate of lime to predominate. This, however, is not a mere mixture of fixed air with an earthy calx. The rock on being rubbed or broken, emits a fetid or sulphurious odour; evincing that it is a swine-stone or *lapis suillus*. This disagreeable smell attends the limestone in this and adjacent regions. Dr. M. possesses pieces of it charged with martial pyrites. And the sulphur, clay and iron of this association, are intimately blended with the calcareous carbonate. The existence of pyritical limestone explains how by the decomposition of the pyrites sulphuric acid is produced, and gypsum formed.

The calcareous nature of the upper rocks is evinced by the fact, that in the neighborhood of the great cataract as well as at the whirlpool five miles down the river, and at Queenstown two miles further, the inhabitants burn them into limestone for economical purposes. But the material is not always indeterminate or shapeless. It assumes beautiful crystalline forms. Rhomboidal and cubical crystals are formed on its surface, and in its cavities. The former are of a milk-white colour, with oblique angles. The latter are less frequent, generally found in the same clusters with the others of an almost rectangular figure, and of semi-transparent complexion. Other crystals shoot along the vacuities of the limestone; some of an imperfect hexangular

shape, and others in clumps of acute six-sided crystals, both having a resemblance to the dogs-tooth-spar. All these are probably modifications of the calcareous carbonate, by admixtures of magnesia, silex, and perhaps some other ingredients. 1809 Mitchill

These layers of limestone are interspersed with small masses or lumps of gypsum. This is generally of a snowy whiteness, and indeterminate figure. But it is mistaken by some people for the petrified froth of the river. It seems to be formed in consequence of the decomposition of the pyrites imbedded in some parts of the rock. The sulphuric acid to which this process gives rise, expels the carbonic acid, and unites with the limestone by virtue of a more powerful attraction. Thus the common limestone is converted into plaster of paris; or in chymical language, the carbonate of lime is changed into a sulphate. The two compounds very commonly exist together, the limestone and gypsum cohering and making parts of one mineral mass. In some rills where the brimstone appears not to have been combined with oxygen, it oozes out with the water, and discolors the rocks. Thus native sulphur and calcareous sulphurets, may be enumerated among the natural products of Niagara.

To enable the kind and quality of the calcareous rocks, in the western territory of New-York, and the adjacent parts of Canada, to be understood, it ought to be mentioned that organic remains, apparently of animals, are frequently found in them, the greater part of the way from the Seneca Lake to Niagara River, a distance of a hundred miles. At the remarkable sulphureous spring in the town of Phelps, eleven miles northwest of Geneva, they appear like corralines and madrepores. On both sides of the Genesee and Ionewanto rivers, they resemble marine shells. While on the east and west banks of Niagara river, they assume, in addition to the already enumerated forms, those that have erroneously been called petrified wasp's-nests and honeycombs. In some cases these calcareous petrifactions are blended with pyrites; and in others they are impregnated with a petroleum or bituminous matter, called Seneca oil. These petrifactions do

1809
Mitchill

not indeed so remarkably distinguish the limestone at the spot where the cataract is; but, as the calcareous strata there possess the same general character with that in the adjoining districts, it was thought proper in drawing up this sketch, to mention the marks of the common saline and maritime origin.

The silicious ingredients in the rocks hereabout were observed by Dr. Mitchill to consist mostly of quartz and flint. The quartz is sometimes mingled with the calcareous carbonate in such quantity as to give sparks with steel; forming a sort of silicious limestone. In other cases it exists in veins or streaks almost unmixed. And lastly it bespangles the surface with elegant crystals, hard enough to scratch glass. The flint of the falls is whitish; but near the outlet of lake Erie it is blackish. In both places it is distinctly bedded in the limestone; and their quantity is relatively small, particularly at the former place. . . .

Such, according to this gentleman's report, is the constitution of the solid strata at Niagara, and in its vicinity. The uppermost are horizontal and tabular; when a stratum is discontinued, its termination is abrupt, forming a sudden descent. This descent, at any one place, is proportional to the thickness of the stratum. Several of these strata break off in this manner, about half way between Chipeway and the grand cataract. And they continue their interruptions to the evenness of the channel, the whole distance beyond. At each termination the river treads lower, and skips and dances along to the next. It marches down this, and proceeds to the succeeding one. Then it runs from stage to stage, until after a gradual and majestic progress of a mile, gathering force and velocity at every step, it leaps from the high and final precipice.

The mighty and immeasurable torrent dashes upon a ledge of detached and enormous rocks, the fragments of the superior strata that have been broken off, and precipitated in the course of the ages. All the pieces which the vehement and unceasing current can stir, are washed away. None remain but those that are too heavy for removal. These form a rough and broken

bottom for the floods to rush upon. Their solidity and size check the impetuosity of the headlong river. Their crags convert a part of it into mist, which rises like an exhalation to an altitude sufficient to be seen for many miles, and which bedews the adjacent district with a moisture resembling rain. On the Canada side, they are in a great degree concealed from sight by the foaming water, and the rising spray that invest them. But on the New-York side, where the height of the fall is greater and the quantity of water smaller, the inferior ledge of rocks can be better discerned as they lie piled upon each other in all the rudeness of accidental disposition; these form a barrier to protect the frail basis of slate from the assault of the water. By the intervention of these impassive heaps, the shistus, notwithstanding its shattered constitution, maintains its ground remarkably, and yields but slowly. Yet, under the operation of such powerful causes, it gives way at last, though only inch by inch. In consequence of this moderate, but certain removal of the shistic foundation, the calcareous strata are at length deprived of their support, and yards and perches, as is believed, of their extremities have disappeared within the recollection of persons now alive. 1809 Mitchill

By this means the cataract seems to have moved its place, and not to have been stationary at any one point. Beyond a doubt, says Dr. M. it is proceeding up the stream, and drawing nearer to Chipeway and Erie.

1818–1819

DUNCAN, JOHN M. Travels through part of the United States and Canada in 1818 and 1819. Glasgow. 1823. 2:52–57. 1818–19 Duncan

The falls of Niagara are among those phenomena in the external world, from which speculatists have spun a cobweb theory of the earth, proving or intended to prove

> "That he who made it, and revealed its date
> To Moses, was mistaken in its age."

There is every reason to believe from the aspect of the banks, and the character of the surrounding country above and below

1818–19
Duncan

the falls, that the river has at some former period scooped out the channel, through the solid limestone, from Queenston, about seven miles below, to the position of the present cataracts. Below Queenston, the ground on both sides of the river is very nearly of the same level with the banks of lake Ontario, but at that town it rises with a sudden and steep slope crossing the river at right angles to its channel, and continuing gradually to increase in elevation, till it attains the height of lake Erie. At Queenston the inner surface of the banks first becomes precipitous and broken; and mineralogists of whose accuracy and fidelity there can be no doubt, have ascertained, by minute inspection, that the strata on the opposite sides of the river correspond exactly with each other, and scarcely vary to the situation of the present falls. From these premises it has been concluded, that the waters of the Niagara formerly ran down the face of the heights of Queenston,— that the rocky material at last gave way under the continued attrition, and that the cataract gradually worked its way backward, till it separated into two at the present position. Not only so, but that this process has continued with the most unvarying regularity, accomplishing very nearly the same number of inches in the same space of time. This backward motion however, if any such there be, is at present amazingly slow, and it is therefore decided, with unhesitating certainty and coolness, that the world must have existed, and the waters of the Niagara been at work, for a much larger period than six thousand years.

With the same facility of hypothesis and assertion, they have decided upon its future as easily as upon its past operations. It is inevitably certain, we are assured, that it will gradually saw its way twenty miles farther and drain lake Erie, and going backward three hundred miles, take up its temporary residence below Detroit. It is needless for us at present to pursue it farther.

But if we grant, that there was a time when the water from lake Erie first made a breach in Queenston heights, these theorists cannot refuse, that there must have been a previous time

when no breach as yet existed. If so, where then was the outlet of lake Erie? By what channel did the waters of the great chain of western lakes, above Ontario, find a passage to the ocean? If these lakes did not then exist, and if they and their outlet were the simultaneous result of some mighty terraqueous convulsion, may it not be as reasonably concluded that the whole channel of the Niagara, from the present falls to Queenston, was ploughed out by the same revolutionizing struggle? — and that in place of being the operation of thousands of years, it may have been the work of a month or perhaps of a day? Upon this supposition it is not difficult to account for the present position of the falls; below them the channel is comparatively narrow and confined, and the current must have raged, as indeed it still does, with much more fury and effect than where it is less pent up. At the falls it is divided by an island into two arms, each wider than the channel below; and farther up it is diffused over a still more ample surface, peacefully winding round islands of various sizes, or smoothly expanding into a kind of bay. Within the semicircular outline also of the present falls, a kind of basin is embraced, in which the water foams and whirls in great agitation, but in which it has space to subside into smoothness before breaking on the bank; and it is comparatively tranquil at a short distance below. 1818–19 Duncan

In a word, the assertions which have been made respecting the gradual retrocession of the falls, seem to be altogether gratuitous. It is possible that some partial change may take place in the outline of the great fall; some piece of rock may give way, as was the case in the bank below, but there seems not the slightest reason to believe, either that the change has hitherto been incessant and gradual, or that it will hereafter be so. The earliest accounts which were given of them by European writers are obviously and grossly fabulous, describing them as seven or eight hundred feet high, and a mile and a half broad; but the first which were at all authentic correspond remarkably,

1818–19
Duncan

at the distance of a century, with the present aspect of the cataracts. Goat Island is correctly delineated according to its present condition; for to this day, as then, it exactly coincides with the edge of the precipice over which the water on each side descends. Weld indeed, who visited the falls in 1796, speaks in decided terms of a change in the features of the Horse Shoe fall, but apart from the consideration that this writer is somewhat addicted to the marvelous, his account is not consistent with itself. He says, that "within the memory of many of the present inhabitants of the country, the falls have receded *several yards*," and "tradition tells us that the Great Fall instead of having been in the form of a horse shoe, once projected in the middle." Among whom this tradition prevails he does not mention, but immediately adds — "for a century past however it has remained nearly in the present form." That the falls had receded several yards, in the recollection of those who were then alive, is sufficiently disproved by the consideration, that if so, Goat Island must have projected so many yards below them, while in point of fact it does not to this day project a single foot; and how their receding several yards in one generation, can be reconciled with the concession that the Great Fall has preserved its present form for nearly a century, would puzzle a geologist to tell. The fact is, there is nothing known of the falls beyond the specified century, and those who are disposed to invent marvellous stories respecting their youthful days, are completely unfettered either by historical or traditional record.

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At Queenston the navigation of the river is resumed, and a canal has long been talked of, to save the land carriage, which is at present necessary between this and Chippewa. Probably as the country increases in population, and its inhabitants in capital and enterprise, this may be accomplished, but in its present condition the idea is hopeless.

American Fall in 1827

(The Horseshoe Fall is in the distance)

Copy of sketch by Capt. Basil Hall, with camera lucida, from American shore

1819

FOOT, LYMAN. Notices of geology and mineralogy (of Niagara Falls region). (Am. jour. of sci. 1822. 4: No. 1, 35–37.) 1819 Foot

A letter dated June 15, 1819, in which the author describes the formations and outcroppings on the Niagara river which were noticed on a trip from Fort Niagara to Buffalo.

1820

EATON, AMOS. An index to the geology of the northern states, with transverse sections, extending from Susquehanna river to the Atlantic, crossing Catskill mountains; to which is prefixed a geological grammar. 2d. ed. Troy, N. Y. 1820. Pp. 214–215. 1820 Eaton

A quaint book by one of our early scientists. The extracts here given are quoted by Eaton from Bakewell's "Introduction to Geology."

On the continent of America, nature acts upon a magnificent scale. Were her operations attended to, they might illustrate many interesting facts in geology. Since the banks of the cataract of Niagara were inhabited by Europeans, they have observed that it is progressively shortening the distance from Lake Erie to Lake Ontario. When it has worn down the intervening calcareous rocks and effected a junction, the upper lake will become dry land, and form an extensive plain, surrounded by rising ground, and watered by a river or smaller lake, which will occupy the lowest part.

In this plain future geologists may trace successive layers of fresh-water formation, covering the subjacent limestone. The gradual deposition of minute earthy particles, or the more rapid subsidence of mud from sudden inundations, will form different distinct beds, in which will be found remains of fresh-water fish, of vegetables and of quadrupeds.

Large animals are frequently borne along by the rapidity of the current, and precipitated down the cataract. Their broken bones mixed with calcareous sediment, may form calcareous rock where the waters first subside after their descent. Bones of quadrupeds are found thus intermixed in the calcareous rock at Gibraltar.

1822

1822
Dwight

DWIGHT, TIMOTHY. Travels; in New-England and New-York. New Haven: Timothy Dwight. S. Converse, printer. 1821–1822. 4:80–103.

About four miles above the cataract we began to see the mist, raised by the agitation of the water, ascending in the form of a large white cloud, and continually varying its aspect, as it was blown by the wind into every fantastical shape. At times, it almost entirely disappeared; at others, it burst suddenly upon the sight; and, rising slowly, with great solemnity and grandeur, dispersed its magnificent volumes into the atmosphere. Nothing could afford us more noble anticipations of the splendour of the scene, to which we were approaching.

After dining at Chippeway, we proceeded to the cataract. About a mile from our inn, we were presented with one of the noblest prospects in the world; the more impressive, as none of us had ever heard it mentioned. Here the immense bed of limestone, which fills this country, begins rapidly to decline. A number of shelves, parallel to each other, cross the river obliquely, almost to the American shore. They are however irregular, broken, and wild; formed into long and short ranges, sudden prominences, and pointed rocks. Over this ragged and finely varied surface, the river rolls its amazing mass of waters with a force and grandeur, of which my own mind had never before formed a conception. The torrent is thrown up with immeasurable violence, as it rushes down the vast declivity, between two and three miles in breadth, into a thousand eminences of foam. All the magnificence of water scenery shrunk in a moment into playthings of Lilliput.

When we came over against the cataract, we secured our horses and descended the ancient bank of the river; a steep of one hundred and fifty or two hundred feet. The foot-way which conducted us, was of clay; and having been wet by the preceding rain, was so slippery that we could hardly keep our footing. At the bottom we found a swamp, encumbered with

trees, bushes, mire, and water. After stooping, struggling, and sliding, near a quarter of a mile, we came to the Table Rock; a part of the stratum, over which the river descends, and the edge of the precipice, which at this place forms the British bank of the river. This rock is at a small distance from the cataract; and presents the spectator with as perfect a view, as can be imagined. 1822 Dwight

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These falls are situated twenty-one miles, reckoned on the British, and twenty-three, reckoned on the American arm of the river, (where it is divided by Grand Isle,) from Buffaloe, two miles less from the outlet of Lake Erie, and fourteen miles from the entrance of the river into Lake Ontario, between Newark and Fort Niagara. The river bends, on the American side, about twelve miles to the North-West, and on the British side, about four, immediately below Navy-Island. It is here little less than four miles wide, and sufficiently deep for any navigation. It gradually becomes narrower, as it approaches the falls; but immediately above them its breadth is not far from three miles. From one mile and three quarters above, or opposite to the Stedman farm, it begins to descend with a rapid and powerful current. At the falls it turns instantly with a right angle to the North-East, and in a moment is contracted to three quarters of a mile.

Below the falls the river is not more, and in some places it is less, than half a mile in breadth. Its depth here is great, being said to exceed three hundred feet; and its current is violent, proportionately to this contraction.

The cataract is formed by the brow of that vast bed of limestone, which is the base of all this country. . . .

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The quantity of water descending at this place in a given time, may with considerable probability be estimated from the following data.

The river at the ferry is seven furlongs wide, and at an average twenty-five feet deep. The latter of these facts I received from an intelligent ferryman. The same man stated the current

1822
Dwight

at four miles an hour. I am satisfied that it moves six miles an hour. I allege the following reasons.

1. Notwithstanding the great depth of the water, and its absolute freedom from any obstructions, the surface at the ferry is strongly rippled; resembling the water of a mill-stream where it is shallow, and runs rapidly over a bed of stones.

2. The surface is here so oblique as to present a striking obliquity to the eye.

3. The boats, as we crossed, and re-crossed the river with three stout oarsmen, fell down the stream one half of a mile. The boats were light, and convenient; and the wind was not unfavourable.

4. We travelled on the banks of the river four miles an hour by the watch; and the rapidity of the current evidently exceeded our progress.

5. Mr. Lamson, an intelligent and respectable inhabitant of the County of St. Lawrence, who has examined this subject with attention, informed me, that the current had been proved to be six miles an hour by a log, thrown into the river at the ferry, and floated down to the village of Chippeway. It is to be observed, that at the ferry the rapidity is greater than at any place between that and the village.

6. An ocular comparison with other streams, too tedious to be mentioned here, will establish this estimate.

For these reasons, I am satisfied, that the current of this river is six miles an hour. If we calculate the quantity of water which passes the ferry, and of course descends at this cataract, on the supposition, that the current is five miles, it will in an hour amount to 85,078,125 tons Avoirdupois; if at six, to 102,-093,750. At five miles the mass will in a day be 2,041,875,000; at six miles, it will be 2,450,250,000. It is not to be supposed, that all these data are precisely correct; yet they cannot be far from the truth.

You will easily believe, that by the falling of such a mass of water from such a height, the stream below must be intensely

convulsed. The world, it is presumed, furnishes no example of similar agitation. The river does not, however, boil, in the common acceptation of that word, at all. The whole surface, and probably all beneath it, is a body of foam, differing essentially from what I have seen produced elsewhere, and much more strongly indicating the immense force of the current. The bubbles, of which it is universally composed, are extremely small; and appear continually ascending, and spreading on the surface, in millions of irregular circular areas. These are all limited by lines, formed by chains of the larger bubbles, stretching between the several areas, so as to mark distinctly the extent of each. The lines themselves fluctuate unceasingly; and, while they continually change their form, more along the surface, also, in every direction. Thus the whole river appears in one common convulsion, as if affected with a deep, paralytic tremor, reaching from shore to shore, as far down the stream, as the eye can trace it, and apparently from the surface to the bottom. To give you the impression, which it made on my mind, I think of no better method, than to say, that it seemed as if a vast volcanic struggle had commenced beneath this world of waters, whose incumbent weight hitherto prevented the approaching explosion. 1822 Dwight

The cause of this singular phenomenon may be thus understood. Immediately below the precipice, the bed of the river where it receives the falling sheet, is of immense depth. Into this receptacle the mass of descending water, plunging from such a height, forces its way to the bottom. Here, forming a curve, it begins to ascend. The current is, however, checked in every stage of its progress by the immeasurable weight of the superincumbent water. The motion upward must therefore become slow, divided, and irregular. In these circumstances, instead of a current, there must obviously be a general agitation, an universal heaving; such, as might be expected from the throes of an earthquake. As the ascending current is thus broken, and enervated,

1822
Dwight

before it reaches the surface, the surface is not billowy, but comparatively level. The wavy, tossed aspect of other streams, immediately below their cataracts, is the result of a force, applied at the surface; or of a current, descending only to a moderate depth. In the present case, as the ascending current comes from a depth so vast, it almost equally affects the whole mass, and cannot disturb the common level by the smallest fluctuations. The whole appearance, however, made an impression, on the mind, of an agitation incalculably greater, and a force far more astonishing, than that, which produces the loftiest billows of the ocean. This was a scene, which I was unprepared to expect, and an exhibition of the force of water, which I had never before imagined.

. . . . .

The noise of this cataract has often been the object of admiration, and the subject of loose and general description. We heard it distinctly when crossing the ferry at the distance of eighteen miles; the wind blowing from the North-West, almost at right angles with the direction of the sound. Two gentlemen, who had lived some time at York, on the North side of Lake Ontario, and who were my companions in the stage, informed me, that it was not unfrequently heard there. The distance is fifty miles.

The note, or tone, if I may call it such, is the same with the hoarse roar of the ocean; being much more grave, or less shrill, than that which proceeds from other objects of the same nature. It is not only louder, but seems as if it were expanded to a singular extent; as if it filled the atmosphere, and spread over all the surrounding country. The only variety, which attends it, is a continual undulation; resembling that of long musical chords, when struck with a forcible impulse. These undulations succeed each other with great rapidity. When two persons stand very near to each other, they can mutually hear their ordinary conversation. When removed to a small distance, they are obliged to halloo; and, when removed a little farther, cannot be heard at all. Every other sound is drowned in the tempest of noise, made

by the water; and all else in the regions of nature appears to be dumb. This noise is a vast thunder, filling the heavens; shaking the earth; and leaving the mind, although perfectly conscious of safety, and affected with a sense of grandeur only, lost and astonished, swelling with emotions which engross all its faculties, and mock the power of utterance. 1822 Dwight

The strength of this sound may be illustrated in the following manner: The roar of the ocean on the beach, South of Long-Island, is sometimes heard in New-Haven, at the distance of forty miles. The cataract of Niagara is heard ten miles farther.

All cataracts produce greater or less quantities of mist; a proof to the common eye, that vapor may rise by mere agitation. The mist, raised here, is proportioned to the greatness of the cause. A large, majestic cloud, visible from an advantageous position for a great number of miles, rises without intermission from the whole breadth of the river below; and, ascending with a slow, solemn progress, partly spreads itself down the stream by an arching, and wonderfully magnificent motion; and partly mounts towards heaven, blown into every wild and fantastical form; when, separating into smaller clouds, it successively floats away through the atmosphere.

Nearest to the shore a considerable quantity of this vapor impinges against the rock; and, continually accumulating, descends in a constant shower of drops, and little streams. A person, standing under the shelving part of these rocks, would in a short time be wet to the skin.

In the mist, produced by all cataracts, rainbows are ordinarily seen in a proper position, when the sun shines; always, indeed, unless when the vapour is too rare. Twice, while we were here, the sun broke through the clouds, and lighted up in a moment the most lucid rainbow, which I ever beheld. In each instance the phenomenon continued a long time; and left us in perfect leisure to enjoy its splendours. It commenced near the precipice, and extended, so far as I was able to judge, at least a mile down the river. In the latter instance, the sun was near the horizon;

1822
Dwight

and the cusps of the bow were depressed as much beneath the horizontal level, as the sun was above it. It was therefore a semicircle; and the vertex was half a mile above the base. In the former instance the dimensions were somewhat smaller. Both were however interrupted. The Southern part of that, here principally insisted on, or the division next to the precipice, was continued from the base to the vertex, and was therefore a full quadrant. The Northern part, commencing at the base, did not exceed one quarter of the other.

In one respect both these rainbows differed widely from all others, which I had seen; and, so far as I remember, from those of which I have read. The red, orange, and yellow, were so vivid, as to excite in our whole company strong emotions of surprise and pleasure; while the green, blue, indigo, and violet, were certainly not more brilliant than in those, which are usually seen on the bosom of a shower. I thought them less bright; possibly because they were so faint, compared with the other colours. The cause of this peculiarity I have not attempted to investigate. The fact was certain; and the phenomenon more glorious than any of the kind, which I had ever seen, or than I am able to describe.

When the eye was fixed upon any spot, commencing a few rods above the precipice, that is, where the cataract begins to be formed, the descending water assumes every where a circular figure from the place, where it begins to descend, to that, where it falls perpendicularly. The motion, here, remarkably resembles that of a wheel, rolling towards the spectator. The section is about one fifth or one sixth part of a circle, perhaps twelve rods in diameter. The effect of this motion of so vast a body of water, equally novel and singular, was exquisitely delightful. It was an object of inexpressible grandeur, united with intense beauty of figure; a beauty, greatly heightened by the brilliant and most elegant sea-green of the waters, fading imperceptibly into a perfect white at the brow of the precipice.

The emotions, excited by the view of this stupendous scene are

unutterable. When the spectator casts his eye over the long ranges of ragged cliffs, which form the shores of this great river below the cataract; cliffs one hundred and fifty feet in height, bordering it with lonely gloom and grandeur, and shrouded every where by shaggy forests; when he surveys the precipice above, stretching with so great an amplitude, rising to so great a height, and presenting in a single view its awful brow, with an impression, not a little enhanced by the division, which the island forms between the two great branches of the river; when he contemplates the enormous mass of water, pouring from this astonishing height in sheets so vast, and with a force so amazing; when, turning his eye to the flood beneath, he beholds the immense convulsion of the mighty mass; and listens to the majestic sound which fills the heavens; his mind is overwhelmed by thoughts too great, and by impressions too powerful, to permit the current of the intellect to flow with serenity. The disturbance of his mind resembles that of the waters beneath him. His bosom swells with emotions never felt, his thoughts labour in a manner never known, before. The pleasure is exquisite but violent. The conceptions are clear and strong, but rapid and tumultuous. The struggle within is discovered by the fixedness of his position, the deep solemnity of his aspect, and the intense gaze of his eye. When he moves, his motions appear uncontrived. When he is spoken to, he is silent; or, if he speaks, his answers are short, wandering from the subject, and indicating that absence of mind, which is the result of labouring contemplation. 1822 Dwight

All these impressions are heightened to a degree, which cannot be conjectured, by the slowly ascending volumes of mist, rolled and tossed into a thousand forms by the varying blast; and by the splendour of the rainbow, successively illuminating their bosom. At the same time, the spectator cannot but reflect, that he is surveying the most remarkable object on the globe. Nor will he fail to remember, that he stands upon a river, in most respects equal, and in several of high distinctions superiour, to every other; or that the inland seas which it empties, the mass of

1822 Dwight

water which it conveys, the commercial advantages which it furnishes, and the grandeur of its disruption in the spring, are all suitable accompaniments of so sublime and glorious a scene.

1826

1826 Geddes

GEDDES, JAMES. Observations on the geological features of the south side of the Ontario valley in a letter to F. Romeyn Beck. (Am. jour. of sci., Oct. 1826, 11:213–218.)

Observations on the formation, contour and geological history of the Niagara gorge.

1827

1827 Hall

HALL, *Capt.* BASIL. Notice of the pressure of the atmosphere, etc., within the cataract of Niagara. (Jour. Frank. inst. 1827. 5:48–51.)

A letter written to Professor Silliman under date of October 29, 1827, and apparently taken from Professor Silliman's journal. The author, a captain in the Royal Navy and F. R. S. describes his experiment to ascertain the barometric pressure at the Falls, and feels "quite confident, of having succeeded in ascertaining, that there was no sensible difference between the elasticity of the air at the station on the outside of the falls, and at that, one hundred and fifty-three feet within them."

1829

1829* Bakewell

BAKEWELL, ROBERT, JR. On the Falls of Niagara and on the physical structure of the adjacent country. (Loudon's mag. of nat. hist., Jan. 1830. 3:117–130.)

Besides the description of the country around the Falls, there is a general account of the cataract itself, with an account of the author's first view and what he considers the grandest view — from the foot of the limestone rock on the Canadian side. He also gives his opinions on the recession of the Falls, the formation of the different strata, the origin of the Falls at Queenstown, and his observation on the gradual cutting through the rock, discernible at the time of his visit, which was made in 1829.

1831

1831 Featherstonehaugh

FEATHERSTONEHAUGH, G. W. On the ancient drainage of North America, and the origin of the cataract of Niagara. (Mon. Am. jour. of geol. and nat. sci., July 1831. 1:13–21.)

A flat view of Niagara taken from a model by Mr. George Catlin, "a very ingenious artist." The account is excellent considering the date.

It deals with the origin of the lakes, here anticipating Gilbert and other more modern geologists, then takes up the origin of the river and the recession of the Falls. The author realizes the complexity of the recession problem and dissents from Lyell's computation, which is based on the assumption that the disintegrating power of the river was equal throughout its course. **1831** Featherstonehaugh

I shall in this paper make some general observation upon the ancient drainage of North America, and then apply the operating principle to the history of the origin of the cataract of Niagara.

. . . . .

There are many persons, among the great number who annually visit this magnificent waterfall, who cannot be made to comprehend, that it is a reasonable matter, to suppose the cataract in ancient times, went over the Queenston ridge, now near six miles distant from the present falls; and an engineer [1] of the state of New York, who appears to have had much experience in the surveys of that State, has published a paper in the proceedings of a learned society,[2] in which he denies that supposition, and supposes the ravine between Queenstown and the falls through which the Niagara river flows to be a natural gorge. I shall in this paper attempt to settle this question upon strict geological principles, and in a manner consistent with those obvious features which the physical geography of the lake country presents.

In ancient times, when the whole country was under water, and Ontario and Erie were on a level, the cataract of Niagara did not exist: but when the general subsidence of waters took place, when Erie fell below the level of the Illinois, and Ontario below the level of Queenstown ridge, the waters of Erie would of course take a direction to join the great eastern line of drainage. . . .

. . . Here then we find the origin of the falls of Niagara, which would have their perpendicular height increased with the

[1] Mr. Geddes.

[2] Albany Institute.

1831 Featherstonehaugh

progressive subsidence of the waters of Ontario. These waters would soon clear themselves a passage through the superficial diluvium, and the manner in which the whole gorge has been excavated from Queenstown to the point now occupied by the cataract, is attested by what we observe going on in our own day. The loose friable shale is loosened and washed out by the re-action of the fallen waters, and the superincumbent limestone losing its only support, yields to the weight of the water, and falls into the gorge. The well known Table Rock is an instance of this. The shale has been completely washed out from beneath it, and great portions of it have fallen, as other parts belonging to the edge of the cataract are constantly doing. It is also particularly deserving of notice, that the limestone beds immediately above the shale, are much thinner at the opening of the gorge, and the rock less capable of resisting attrition, than the superior beds which are so well compacted with chert, and which the cataract is now approaching. That the greatest portion of the rock which has hitherto fallen, has been comminuted, and washed away by the stream, as the whole of the shale has been, appears not unreasonable, and may account for the absence of a great portion of the fragments. There is scarce a single circumstance connected with this majestic cataract, which does not assist in the explanation of its retrocession..

As to the period which has elapsed since the waters first began to open the gorge, it is difficult to open a plausible ground upon which a reasonable calculation could be made; but there is one circumstance connected with them, which marks a difference of progress, at certain points of their retrocession. The distance from Queenstown to the falls, is between six and seven miles by the line of the gorge, the average breadth of which on approaching the falls, is about 1200 feet. By a reference to the plan, it will appear, that up to the period when the waters which fall on the American side, first divided Goat Island from the main land, the whole force of the river Niagara, was exerted in one volume, upon a surface of 1200 feet in extent, forming the width of the

gorge. Since that time the operative power of the water, has spread itself over a greater surface; for the stream on the American side, is 1072 feet wide, and the curvature of the great Horse Shoe fall is 2376 feet wide, making a surface of 3448 feet long, being near three times the extent of the line it previously exerted itself upon. 1831 Featherstonehaugh

This diminished exertion would necessarily be attended by a retardation in the retrocession of the cataract. There is also another circumstance which at present adds to this cause of retardation. The Horse Shoe fall has reached a point, where the limestone beds begin to thicken, and the foam of the rapids, marks the presence of the terraces of cherty layers, which are here found superincumbent, and giving additional strength and durability to the limestone strata. I might offer as evidence of the very prolonged projection of the waters at this point, the deep basin in the bed of the river, immediately at the foot of the falls, which does not occur in the narrower parts of the gorge, and which has hitherto been unaccounted for.

It has often been proposed to mark in some well regulated manner, the future disintegration of the bed of this cataract, with a view to compute the period of its age. If I have not misconceived the operation of this river, it will now be seen that the elements of this problem are too complicated and vague, to offer any hopes of a satisfactory solution. Under the view I have taken of it, its future recession will be very slow. Time, however, will last longer than the carboniferous limestone can probably resist such influences as it has already yielded to. When the cataract shall reach lake Erie, geology will possess one great monument of the power of water to excavate gorges of great length and height.

Mr. Lyell, in his principles of Geology, (1:181) has,— supposing that the disintegrating power of the volume of the Niagara river, will at all times be equal, at every point of its course — ventured on a computation, that, at the rate of fifty yards in forty years, lake Erie will be reached in the course of

1831 Featherstonehaugh

thirty thousand years. That the recession of these falls is affected as Mr. Lyell supposes, we have never doubted; but a long and familiar acquaintance with the cataract, has induced us to adopt the opinion we have just seen announced by the Rev. W. D. Conybeare, (Annals of Philosophy, No. 52. April, 1831. Page 267), that in forming the first estimates of this computation "some partial degradation of the strata has here been mistaken for the general retrogradation."

He especially controverted Mr. James Geddes.

Made certain general observations on the ancient drainage of N. A., and applied the operating principle to the origin of the cataract of Niagara.

1832

1832 Bouchette

BOUCHETTE, JOSEPH. The British dominions in North America; or a topographical and statistical description of the provinces of Lower and Upper Canada, New Brunswick, Nova Scotia, the islands of Newfoundland, Prince Edward and Cape Breton, including considerations on land-granting and emigration. . . . Lond.: Longman, Rees, Orme, Brown, Green, and Longman. 1832. 1:138–147.

On page 144 and 145 is found a description of the sound of the Falls which is quoted below.

The noise of the Falls is truly grand, commanding, and majestic; filling the vault of heaven when heard in its fulness, and seeming mystically to impregnate ether with its absorbing sounds. It is very variable in its loudness, being essentially influenced by the state of the atmosphere, the direction of the wind, and the position of the listener. It is sometimes scarcely audible within three or four miles; and at others it may be heard at York, on the opposite shores of Lake Ontario, a distance of six-and-forty miles. The relative situation of York with the mouth of the Niagara river favours the travelling of the sound thus far when the air is remarkably still, or acted upon by south-easterly winds.

It were difficult to convey a very distinct idea of the deep round roar of Niagara; indeed there is a sonorous cadence in

the noise of waterfalls,— an alternation of muffled and open sounds,— that can find no perfect similitude. It has been likened to the hoarse voice of oceanic surges heavily lashing the sea-shore; to the plunging dash of huge spherical stones hurled in quick and ceaseless succession from a precipice of great altitude into profound waters; to the effect produced in a vast mill by the "ceaseless, rumbling, deep, monotonous sound," accompanied with tremor, of numerous sets of millstones moving simultaneously; but, however these assimilations, and especially the last, which is certainly the best and most familiar, may serve to illustrate description and aid the imagination, yet they are not quite perfect, as the sounds compared are either inadequate resemblances in themselves or deficient in majesty. Perhaps nothing can come nearer the cadence, fulness, and dignity of the sphere-filling thunders of Niagara than the spirited engagement at sea, in still weather, of two heavy squadrons, six or eight miles off. To a spectator on the heights of Aboukir, the battle of the Nile must have conveyed a correct idea of the roaring, rolling, rumbling, thundering noise of this wonderful cataract. 1832 Bouchette

1833

FINCH, I. Travels in the United States of America and Canada. . . . Lond.: Longman, Rees. 1833. Pp. 328–331. 1833 Finch

The author spent three weeks at the Falls studying their geology and enjoying their scenery. He was apparently much impressed, for he writes: "There is but one Niagara — nothing can equal its beauty — nothing can surpass its sublimity." In geological matters he takes issue, at some points, with the conclusions of Hall and Bakewell.

HAMILTON, THOMAS. Men and manners in America. Edinburg and Lond.: 1833. 2:314–331. 1833 Hamilton

The author describes at length his first impressions of the Falls, the noise of the cataract, the rapids, the Fall and islands on the American side, and the country around Niagara. His description of the sound is quoted.

The noise of the great cataract is, certainly, far less than might be expected. Even at its very brink, conversation may be car-

1833 Hamilton

ried on without any considerable elevation of the voice. The sound is that of thunder in its greatest intensity, deep, unbroken, and unchanging. There is no hissing nor splashing; nothing which breaks sharply on the ear; nothing which comes in any degree into collision with the sounds of earth or air. Nothing extrinsic can either add to, or diminish its volume. It mingles with no other voice, and it absorbs none. It would be heard amid the roaring of a volcano, and yet does not drown the chirping of a sparrow.

Visitors generally wish, however, for a greater crash on the tympanum, for something to stun and stupify, and return home complaining that Niagara is less noisy than Trenton or the Cohoes. This is a mistake. The volume of sound produced by the Horseshoe Fall, is far greater than they ever heard before, or, probably, will ever hear again. When the atmosphere is in a condition favourable to act as a conductor of sound, it may be heard at a distance of fifteen, and even twenty miles. A passenger in the coach, who lived six miles beyond Lewiston, assured me, that, in particular states of the barometer, the noise was there distinctly perceptible. But it should be remembered that the great body of sound is generated in a cavern far below the level of the surrounding country, and fenced in on three sides by walls of perpendicular rock. The noise vibrates from side to side of this sunless cavity, and only a small portion escapes into the upper air, through the dense canopy of spray and vapour by which it is overhung. As an experiment, I employed a man to fire a musket below, while I stood on the Table-rock. The report was certainly audible, but scarcely louder than that of a pop-gun.

1834

1834 Fairholme

FAIRHOLME, GEORGE. On the falls of Niagara with some observations on the distinct evidence which they bear to the geological character of the North American plains. (London & Edinburgh phil. mag. 1834. 5:11–25.)

Account of the geological history of the great lake region and the Niagara with the bearing of this history on the scriptural "Mosaic Deluge." The author firmly believed in the fact of a universal deluge about the period denoted by scripture chronology, and believes the formation of Niagara to have been begun "immediately subsequent to the restoration of order after the Mosaic Deluge." 1834 Fairholme

COMSTOCK, JOHN LEE. Outlines of geology. Hartford: D. F. Robinson. 1834. Pp. 30–36. 1834 Comstock

Controverts Lyell's estimate of the age of the Falls.

LIEBER, FRANCIS, *ed.* Letters to a gentleman in Germany, written after a trip from Philadelphia to Niagara. Phila.: Carey, Lea and Blanchard. 1834. Pp. 333–356. 1834 Lieber

This work was reissued in 1835 under the title: "The stranger in America; or, Letters to a gentleman in Germany. . . . By Francis Lieber."

. . . I cannot be counted among those who — some in reality, some apparently — are affected in the presence of the noble aspect of Niagara, more deeply with the sensation of the power of God, than they ever were in their lives before. . . . The firmament, the sea, from a mountain near the shore, the lofty Alps, when they appear for the first time to the lonely wanderer with the rosy evening glow on their hoary summits, like Raphael's Jove with his gray locks, yet cheeks glowing with immortal vigor, have a more expansive power upon my mind than the great falls.

. . . . .

You have read nearly all the late accounts of Niagara, and I shall not detain you by a fresh attempt at description. I merely intend to give you some items in relation to this magnificent spectacle.

. . . . .

The vast inland seas west of the Niagara, send from out the mighty basins their waters toward the Falls, and all their never-ceasing volumes tend to this point, which forms the greatest beauty of that chain of lakes whose vast sheets vie with the sea,

1834
Lieber

extending nearly fifteen hundred miles in length, and constituting the ornament and great blessing of our North. The distant St. Louis, which, in its beginning, moves in a doubtful course, as if undecided whether to contribute its contents to the giant river of our west, and travel with it three thousand miles, down to the gulf of Mexico, or empty itself into the basin of Lake Superior, — is the most remote source of this chain of waters. The last named lake, with a sheet of thirty thousand square miles, Lake Michigan, with a surface of fifteen thousand, Lake Huron with one of eighteen thousand, and all three of amazing depth, so that their bottom is nearly three hundred feet below the ocean tides, while their surface is from six to seven hundred feet above the level of the sea,— and Lake Erie, with a sheet of eight thousand square miles,— all these reservoirs send their waters to Niagara.

Niagara Strait, a channel of thirty-seven miles, connecting Lakes Erie and Ontario, is about a mile in width at its commencement, but narrows and again widens even to as much as five and six miles, and bends in various directions before it arrives at the Falls, after a course of about twenty miles. In some places its depth has been ascertained to be two hundred and forty feet; in others it is probably much greater. Shortly before arriving at the Falls, the course of the stream is a little north of west; rolling over the Falls it makes an abrupt angle, and runs toward north north-east. Not less variable than the breadth and direction of the strait, is the rapidity of the current. Near Black Rock, the velocity is probably not less than from six to eight miles an hour; the stream then glides quietly along, at the rate of not more than from two to four miles, like the silent brooding of a people, mocking patience, before a great revolution. At the Rapids, above the Falls, the current assumes an immense velocity; and the water below the Falls, rushes on, in some places with mad fury, in all, with great rapidity, as far as Lewiston and Queenston. The descent of the water in the strait is three hundred and thirty-four feet.

The banks of the strait are as low as the Falls; from this point the water flows in a deep ravine with rocky walls as high as three hundred and seventy feet, which gradually lower near Lake Ontario. It is this sudden change of the bed which produces the Falls. Immediately below them these stupendous walls, sometimes perpendicular, sometimes with beetling rocks, and defying with very few exceptions the best crags-man, are about three hundred feet high. The distance between the two landing-places of the ferries, nearly a mile below the Falls, is about seventy-six rods. You have then the depth and width of this ravine: its rugged sides are adorned and crested with shrubs and trees. They run nearly parallel; at the beginning or upper end of the ravine, they join in a curve. Over this curve of the ravine rolls the Niagara in three distinct Falls, divided from each other by two islands enthroned on the edge of the ravine. One of them, Goat Island, the largest of a group of three, is quite at the end of the south-eastern side of the ravine, leaving on its western side or end only the closing curve, over which the largest of the cataracts, the Crescent Fall, flows into the deep abyss below. On the northern side of Goat Island, and between it and the small Prospect Island, is the Central Fall. To the north of the latter island, again, is the Schlosser Fall. The bend of Niagara is so peculiar, that it requires some exertion of your mind to arrive at a clear perception of the four cardinal points in relation to the cataract. You ought, however, to represent clearly to yourself the precise situation of the Falls and their bends. . . .

1834 Lieber

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Goat Island contains about sixty acres, and, for a variety of reasons, is a most charming spot. Prospect Island is very small: I have written it down on the tablet of my memory as Isola Preziosa; and a precious isle it is. It lies on the brink of the lofty battlement between the two Falls on the United States side, like a jutting watch-tower, placed there for the purpose of affording the finest prospect of the Schlosser Fall. There is one

1834
Lieber

particular spot,— where you tread upon the roots of a juniper, overhanging the fearful precipice,— from which you can see far under you, and there have a view of the waters precipitating themselves in one great mass after having tumbled over the many cliffs between Goat Island and the main. It is one of the finest situations for the sight. They might have called this island the Islet, par excellence; Prospect Island sounds a little of the show-case.

Let me now rapidly sketch out the upper line or edge of the end of this ravine, which forms the Falls. Schlosser, or the American Fall, as it is sometimes very loosely called, the most northern of the three, is about fifty-six rods in width, and one hundred and sixty-seven in perpendicular descent. Prospect Island is about ten yards in width, and the Central Fall also about ten yards. The edge of the ravine, which is formed by the north-western limit of Goat Island, is eighty rods, and the Crescent or Horse-shoe Fall, extending from Goat Island to the Canada shore, " is about a quarter of a mile in a direct line, or about half a mile following the curve "; which, though Crescent Fall is a fit name, and a thousand times better than Horse-shoe Fall, resembles more a parabolic line, the longer leg of which lies toward the Canada shore, and the apex of which gives way to a sudden angle receding to the south-east. This angle and the comparatively straight line close to it on the west, are the causes of the production of one of the sublimest spectacles in the world, as you will see from the sequel. The whole Crescent is lower than the eastern bank of the ravine, which causes a much greater body of water to roll over it than over either of the other two falls. The perpendicular descent of the Crescent Fall is one hundred and fifty-four feet, therefore, thirteen feet lower than the Schlosser Fall.

From the shore of Goat Island, a bridge, called Terrapin Bridge, of three hundred feet in length, is built, leading to a point north of the receding angle of the Crescent just mentioned, and projecting over the falls about eight or ten feet. It ends in a point, and this point, (from which you can see perpendicularly

down into the gulf, while under your feet the waters rush and hurry on, and swell and roll over), is one of the jewel-spots, as I call them in my journal, where, as I think I have mentioned already, I have placed all the fine views I have seen, together — a precious list to me. . . The view from the point of this bridge, though of uncommon interest, is not, however, a good view of the Falls, as a whole; this can be only obtained from below, or at a distance. 1834 Lieber

Close to this bridge has been erected a turret, which, I think, is perfectly in keeping with all the gigantic objects and stupendous phenomena around you, provided you can bring yourself to take it for a pepper-box. But I will be fair. Much, and not without reason, is said against this turret, yet from it you have a view of the incision or receding angle of the Crescent, such as you could not possibly have any where else; and, even with regard to its own appearance, I must say that when on one afternoon I saw from Table-Rock the rainbow resting with one end on Goat Island edge, and the other on the opposite shore, like a glorious triumphal arch over the mighty cataract, this turret, seen at a distance, contributed not a little to beautify the great picture. It was a slight indication that man was there, also; somewhat like a little garden which we sometimes suddenly meet with, perched among the steepest rocks in a lonely Alpine country.

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The water, precipitating itself with such immense swiftness over the edge of the ravine, (it descends about fifty-eight feet in the half mile immediately above the Falls), does not, as you may well imagine, drop down perpendicularly, but in a parabolic line. It is believed that the waters of the Crescent Fall touch the surface of the stream below about fifty feet from the point, which they would reach, were the fall perpendicular. The whole height, including the descent of the rapids above, is given as two hundred and sixteen feet.

Owing to this projecting of the waters, the traveller is enabled

1834
Lieber

to get some way behind the sheets of two of these cataracts, the Crescent and Central Falls. The passage behind the latter we owe to Mr. Ingraham, who induced the owner to cut a path in the rock, about midway in the bank. If the sight here is not so full of terror as behind the sheet of the Crescent, you have, at least, a better opportunity of studying the grace of these leaping waters, when the moving crystal arch descends before your eyes, with such a steadiness and continuance, that I, who never was giddy in my life, felt a powerful effect, when I looked up and followed, with my eye, the rushing arch in its whole course down; it was a sensation as if I were powerfully drawn after; and, indeed, I would not advise any one, who is liable to giddiness, to try this particular experiment.

It was, I own with jealous feelings I lately read, that Mr. Ingraham has succeeded in getting behind this sheet from below. He had long foreseen that it would be practicable to penetrate behind this fall. . . . He was the first who insisted upon its possibility, and the first who attempted it, and if he was not actually the first who succeeded in the attempt, it was owing merely to a temporary absence from Niagara.

When I had the good fortune of meeting Mr. Ingraham at Niagara, we went together in a boat to the foot of the Central Fall, and he made an attempt then to penetrate behind the sheet, while our boat was in great danger of being dashed to pieces against the rocks, the current here driving violently toward the shore, owing to the immense mass of water which falls from the centre of Crescent Fall into the depth, and is then forced violently up in the middle of the stream, by the pressure of succeeding volumes of water. At that time he was not successful.

Almost all travellers go behind the sheet of the Crescent Fall, at its western end. The works which you have read have already informed you, that, for the first time you enter, a guide is necessary to lead you through the violent blasts. Most people will always require one. The spot where the path ends is called Termination Rock, and is above a hundred and fifty feet from

the commencement of the volume of water. You cannot arrive there otherwise than perfectly drenched, and the entire novelty of the scene, incomparable with any thing you have ever perceived in your life before, and the difficulty of breathing, as you inhale a quantity of water, would induce most people to give up the idea of penetrating to the end, had not long experience shown that, with proper precaution, there is no real danger. Even most ladies who visit Niagara, go behind this sheet. 1834 Lieber

When I had arrived at the extremity of the path, and looked over into the gulf — the deafening roar, the gusts of water, the sight of the rebellious streams driving in all directions, and of the watery volley shot up from below, the rolling sea above, water on all sides, and the air nauseously impregnated with heavy moisture; the eyes deprived of half their vision, by the water which is driven into them by the violent blasts; and the piercing whistling of the latter round the edges and sharp points of the rocks; the uncertainty of the colour of the waters, white, grey, green, continually changing, and the greenish dim light reaching you through the furious waters above; the enraged froth beneath, boiling in madness, that it must break against the rocks, peaks, and points, when all that which I slowly enumerate, burst in one moment upon me, my first thought or feeling was, " Oh Dante, why couldst thou not see it! "

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The colour of Niagara, when not changed by heavy rains, is a peculiarly beautiful green, differing from sea-green, as it seems to me to have more of an emerald hue in it; I can only compare it to the dye of the Neckar, yet the Niagara is much more beautiful. I have already spoken of the salient angle in the line of the Crescent Fall, and the comparatively straight line to the west of it. I send you a *croquis* of the currents and eddies above and below the Falls; I have taken and verified it from the little wooden house above Table Rock, from the turret, from the spot where the road along the Canada shore bends down to the

1834
Lieber

ferry house, and according to the observations I had an opportunity of making, when I swam in the river immediately below the Falls. . . .

From the accompanying *croquis* you will perceive, that, by the different sweeps of the water, a much greater quantity rolls over the straight line of which I have just spoken, and which occupies less than a third of the Crescent Fall. The most beautiful part of the finest of the cataracts is owing to this circumstance. This immense thick mass of water remains unbroken down to the middle of the Falls, and the colour being of a fine emerald hue, it produces one dense and deep sheet or mass of uncommonly beautiful colour. On the one side is the pointed angle which gives the very picture of irresistible ingulfing, and on each side a large white foamy sheet, like large borders to the green central piece. This emerald part has such a compound character of compactness, united with a transparent crystal elegance, it rolls over the crest so majestically, and has, with all its velocity, such an appearance of steadiness, owing to its thickness and density, and yet the swelling lines on its surface, as it rolls over and descends, form such a graceful contrast with the turmoil and uproar close at hand, that there is nothing in the world to which I can possibly compare it: I have never seen any thing similar, even on a smaller scale — never before, majesty and grace thus blended. Some of the best views of this part are from the window of Biddle Staircase, by which you descend from Goat Island to the river below,— from the middle of the river when you cross in the ferry,— and from Table Rock, a rock which, in the form of a plate, projects and forms a precipice close to the north-eastern end of the Crescent. It is a hundred and sixty-three feet from the depth, and it projects so much, that when you look down,— lying, of course, flat on the ground, as every experienced traveller does in such cases,— to *enjoy* a *precipice*, you can see not only perpendicularly down, but even under the rock. To your right you have the Crescent Fall, and you may see the upper part of the emerald sheet to more advantage from

here than from any other spot; while the rest of the great cataract has, from this point, the character of the terrific. None of the three falls *tumble;* they *leap:* and from Table Rock you may see the long leap which the waters make, down to where the horror of an eternal mist covers the still more horrific depth. The terror of Niagara from here is like the fury of a lion, who leaps with grace upon his prey. 1834 Lieber

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Yet, as if placed here to comfort man, and to show him that, though nature may seem for a moment to move in rebellious lawlessness, and to have broken from its fixed lines, yet every atom carries its eternal law along with it, and cannot move out of its character,— floats over all this roar and riot of the elements a consoling rainbow formed of the very water which but a moment before carried destruction in its heedless hurry,— to remind you that there is order in nature where you perceive but wild disorder, and that fearful struggle or loathsome dissolution returns to the beauty which graces the universe,— that "the spirit of God moveth upon the face of the waters."

The lunar bow is equally beautiful; I saw it one night, tinged with a slight hue of its brighter mate, to whom the sun lends his splendour. It looked like a rainbow, pale from grief; and as it rested over the foaming waters of Niagara — truly like "Love watching madness with unalterable mien." This madness of the waters is found, however, only in the gulf below; where the boiling, and gushing, and leaping element, as if fury had changed its nature, wrestles with the firm rocks and conquers them in the long struggle.

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There is, strong as it may sound to you, a character of majestic steadiness in the Niagara Falls. Those gigantic masses preserve their compact form, throughout one half of their entire fall, and as they roll over the precipice, and descend to midway, almost unchanged, present such an unbroken front, that the

1834
Lieber

whole picture has about it an appearance as if the waters had been commanded to stand still, and had been suddenly stopped in their course. It is the contrast which this distinguishing feature of the cataract forms with the bounding leap, and the actual and known velocity of the waters, together with the many other contrasts which this phenomenon presents, the deafening noise and blinding spray, with the bright rainbow, and the sparkling surface of parts of the waters, the solemn roar and the piercing single tones, the thriving cheerful vegetation on the banks, and the helpless weed whipped against the rock — it is the thousand contrasts which you meet here, that lend so inexpressible a charm to this stupendous and lovely phenomenon, and which cause every one to take leave of it, as of a friend you have learned to love, in spite of the essential sternness and grandeur of his character.

The *emerald*, of which I spoke above, is not seen with the Schlosser, nor Central Falls; they leap in a sheet of foam from their immense height. About two-thirds of the surface of the water, enclosed by the Crescent Fall, are covered with impenetrable spray and mist, out of which the peculiar meteors or jets I mentioned are seen to shoot up. Captain Hall calls them cones, or comets. I saw them rather in the shape of a hay-stack, the top of which was formed by a compact body of water, from which a thick spray descending, gave the outline of the sides.

Where the mist becomes thinner, you perceive the leaping and foaming surface; a little lower down the river, the surface becomes comparatively calm, yet is covered with one thick coat of foam, which extends a considerable distance down the river, — farther on the Canada side than on the opposite,— forming what might be termed the snow-field of waters. It was to this snow-field that I endeavoured to approach as near as possible, and if practicable to get into it, when I made the excursion mentioned above with Mr. Ingraham. I was desirous of determining the bouyancy of this foamy water by immersing my body in it; but the boatmen could not take us close enough up to it. I

therefore went into the water some rods below the margin of the snow-field, intending to swim down to the Canada ferry house, but I met with two difficulties which interrupted my progress. The waves of the river, short, high, and troublesome, without any real swell,— like the waves between breakers,— had, besides, the peculiarity that they did not throw over their foamy crest *with* the current, and, therefore, *from* the swimmer,— as the waves of the sea always throw over the crest with the *wind*,— but *against* the swimmer, owing to the extreme velocity of the current. The motion was at the same time violent; and it became as difficult to keep my breath as to struggle against these retrograde motions. The eddies in different directions were besides very numerous, and irresistible by human force: sometimes I would find myself on a spot at which the water boiled up from below, while at the surface it glided off in all directions, which made it difficult for me to work my body. I do not know whether it was alone the difficulty of swimming that gave me the feeling, or whether the water, not having discharged all the air, was sensibly less buoyant; certain it is that it seemed to me so. I have often swam in the sea and the surf, even near rocks and breakers, and having besides once proved by an uninterrupted swimming of three hours and a quarter, that I can stand great fatigue in that way, you will believe me when I say that the difficulties were not slight. . . .

1834
Lieber

I have often watched the different forms which the single parts composing this great phenomenon, adopt in falling. I succeeded nowhere better in doing this than at the south-western part of the Crescent, where I approached the foot of the Cataract as nearly as I could, without having my sight obstructed by the heavy spray. I was looking up nearly perpendicularly, and saw the water rolling over and descending a considerable distance in a green, transparent arch, the outside of which was rippled by the friction of the air. These ripples increased as the body of water fell, while the water itself began to divide. Soon it assumed the form to which all liquid strives, if left to itself — the globular,

1834
Lieber

and looked like large crystal balls, of a much lighter dye than when it was united in one mass. These balls again subdivided into smaller ones, and became of course lighter in colour with each subdivision, while the friction of the air caused particles of the surface to fly off as little satellites of spray. The balls now divided so much, that they appeared like drops of melted glass. You may have seen the exact appearance, in glass works, when drops of melted glass are allowed to fall into water, to produce Prince Rupert's drops. I was reminded at the time of these heavy drops, which deviate from the globular form by having a larger (lower) and a somewhat tapering (upper) end. The tapering end of the water-drop becomes thinner, and the colour, from a state of transparency, changes to a white, owing to the intermixture of air, and a foam appears on the outside of the drops, which now assume the form of descending comets, with a tail of foam, and compact body of water for its head. This soon splits, forms rapidly a number of other smaller comets, which gradually split again until they become mere spray. A part of this changes into mist, and rises out of the valley of roar and struggle. Like a heavy cloud it is sometimes seen hovering over the scene of contest, and, in fair weather, little clouds now and then detach themselves from the larger mass, and rise to unite themselves with some high cloud of the sky, as if to tell the tale of the fearful contest below, and to sail away with it to calmer regions.

The rise of the mist depends much upon the state of the weather, the wind, and the time of the day. A very heavy spray often rises out of the deep basin, draws over Table Rock and drenches the trees. My observations respecting the forms of the water in descending, apply, of course, only to the outer parts. In the centre those heavy masses are precipitated, which reach the water below entire, and create the rumbling thunder which I mentioned. Behind the Central Fall, on Mr. Ingraham's path, I observed the same changes of forms, which, in fact, are very easily accounted for.

Here, at the foot of the south-eastern end of the Crescent, I heard again, and very clearly and distinctly, the third sound peculiar to the Falls. The deep roaring tone, with the thunders between, I have mentioned before; but if you go very near to the water, you hear now and then a shrill piercing sound very much like the horn or trumpet of one of our stage-coachmen, or of the guards of the mail, as I have heard them in London, when hurrying along the Strand. I have not found this peculiar noise of the cataract mentioned any where, yet I am sure that I do not deceive myself; for I have repeatedly noticed them, and found my observation confirmed by several other persons whose attention I had directed to the subject. It is necessary to listen with some attention, otherwise the sound is swallowed up by the overpowering general noise. It seems to me not difficult to explain it: among the endless forms which the water must adopt in this constant and violent motion, it can be easily imagined, that sometimes a mass of water happens to include a quantity of compressed air, which, if opportunity offers, escapes through a small opening, producing this disagreeable shriek, well comparable to the trumpets of evil spirits sounding from the abyss of torment. 1834 Lieber

A staircase leads from the brink of the eastern bank, and a steep path from the top of the western bank to the ferry-houses below. I have suggested, that, to save the trouble of descending and ascending, an apparatus should be constructed for hoisting visitors up and down in a large comfortable basket on iron chains. . . .

Another staircase, leading from the brink of Goat Island to the water below, I have mentioned already. . . . The path behind the Central Fall, the walk to the foot of the south-eastern end of the Crescent, the best views of the Cataract from below, the true views of a waterfall, have thus been presented to us, because it is only by way of this staircase that we can reach the respective point, except by means of boats, which are troublesome and expensive.

Some of the best views of the Cataract are — from above,

1834
Lieber

from Table Rock and Terrapin bridge,— at a distance, from the point where the path winds down from the brink of the Canada bank; from below, from the ferry, where the staircase on the United States side reaches the rocks below, from the window of the Biddle Staircase, and at its foot. Quite at a distance, a noble prospect presents itself on a certain spot, about two miles from the Falls on the road to Lewiston. A vista through the forest gives you a view of the Cataract, and as all greatness, physical or moral, requires distance for its full impression, so also does the Cataract appear to you on this spot in still more solemn grandeur.

I went with a party to the whirlpool, where the waters abruptly turn from a north-westerly course, to a north-easterly, and so swift is the current that the water, sweeping round the corner of the ravine, actually does not find time to put itself on a level, so that you have before you the peculiar phenomenon of a river having in its middle a high water ridge, which I must consider from seven to eight feet high at least; for it can be seen very distinctly from the crest of the bank — here so high that large timbers in the river look like little sticks, and the waves of the rapids, which are very high, appear quite small.

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From the moment when you first see Niagara, to the hour when you leave it, one of the great characteristics with which it strikes the soul of man, is that, like the sea or the Alps, it does and will exist without him. He cannot change it; it spurns his skill and power, nor does it heed thunder or season or time. The changes it undergoes are worked upon itself by its own unconquerable force.

Niagara, besides uniting the characteristic of grave solemnity with that of continued and rapid motion, stands before you like a giant thing, alone but perfect in its construction. The sea affects us by its boundlessness, and its thousand historical and geographical associations; by its horror and destruction at some times, and its graceful movements and refreshing coolness at

A Distant View of the Falls of Niagara

Painted by T. Cole, about 1830; engraved on steel by T. S. Woodcock

others, and by the depth of its womb filled with the elements of life; Niagara affects us by its power, its horror, its grace, and its gigantic beauty all united. 1834 Lieber

Where there is so much motion, so vast a subject presenting itself under such a variety of aspects, you cannot exhaust the interest of the subject, and of the new views and phenomena which are continually arising to your notice, and the longer you tarry the dearer Niagara becomes to you.

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. . . Niagara is like a powerful ode, a rhapsody in which nature herself has seized the mighty harp and plays a rapturous tune.

1835

ROGERS, HENRY D. On the Falls of Niagara and the reasonings of some authors respecting them. (Am. jour. sci., 1835. 27, no. 2:326–335.) 1835 Rogers

The author is especially interested in the valley below the Falls. He takes issue with Fairholme as to the age of the Falls. He holds that information available up to that time was too meager to warrant any calculations in years of the probable duration of the cataract, and he is very doubtful whether the Falls of Niagara could ever have been at Queenston. In his opinion, "a diluvial valley, of greater or less length and depth was . . . probably the commencement of the present remarkable trough below the falls." He thinks that the lake region emerged from beneath the ocean at a very remote period. In his own words, "the drainage of the region has very probably been repeatedly modified since that day, and during some one, or perhaps several of these changes in its hydrography, Niagara acquired its present remarkable shape." He calls attention to the importance of seeking for shell deposits in the diluvial banks along the stream. These deposits were later actually found by Lyell and Hall.

1837

DAUBENY, CHARLES GILES BRIDLE. Journal of a tour through the United States and Canada, made during the years 1837–1838. Oxford: T. Combe, ptr. 1843. Pp. 44–48. 1837 Daubeny

A study of the mineral and burning springs in the neighborhood of Niagara Falls.

1837 Fairholme

FAIRHOLME, GEORGE. Geology. Lond.: 1837.

General view of the geology of the scriptures. Discusses the recession of the Falls of Niagara and thinks the period from 5,000 to 5,500 years.

FAIRHOLME, GEORGE. New and conclusive physical demonstrations, both of the fact and period of the Mosaic deluge, and of its having been the only event of the kind that has taken place upon the earth. Lond. James Ridgway and Sons. 1837. Pp. 157–203.

This chapter is "on the falls of Niagara and the distinct evidences which they afford of a definite and recent commencement." The account of the Falls is by sections and there is a bird's-eye view. The facts used are taken from Burford, Hall, Bakewell and others, as the author had never seen the Falls himself.

1837 Lyell

LYELL, *Sir* CHARLES. Principles of geology. Phila.: J. Kay. 1837. 1:176–178.

A description of the work of recession at Niagara.

1838

1838 Hall

HALL, JAMES. Niagara Falls and river. (Ann. rep'ts of the fourth geol. dis't of N. Y. 1838. Pp. 171–173.)

A brief preliminary report by the New York State Geologist, touching on the rock strata of the gorge and the recession of the Falls.

The gorge through which this river passes at Lewiston, presents the rocks in the following order from the top downwards: limestone twenty feet; shale eighty feet; limestone twenty feet; red marl and sandstone seventy feet, (the upper layers only hard;) hard gray sandstone twenty-five feet; red marl to the level of the river and far below.

These rocks dip to the south, and at the falls have all disappeared beneath the river, except the upper limestone and a part of the shale below. The limestone, which is twenty feet thick on the top of the ridge at Lewiston, is eighty feet at the falls. The great height of the falls when at Lewiston, and the character of the rocks below, must have caused a much more rapid rate of recession at that period than at the present. The height of the falls has decreased as they have progressed south-

ward, in consequence of the dip of the rock in that direction. 1838
This cause has gradually lowered the waters of Lake Erie, and Hall
will finally leave it entirely dry, except the channel of the river. There is, however, no possibility of a great deluge occurring from the sudden drainage of this lake, as stated by Mr. Lyell and other geologists.

If the southern shore of Lake Erie were formed by a vertical wall of rock extending to the bottom, this catastrophe might be apprehended; but as it is, the bed of the lake where the Niagara river leaves it is solid limestone, sloping south towards the centre. We perceive, then, that the lake can be drained no faster than this rock is worn off by the action of the water. The force of the river is gradually decreasing, and of course the recession will be more gradual from this cause. But for another reason, the rate of recession will be incalculably less as we progress southward. At the present time the falls recede principally by the action of the water on the soft shale below, wearing it rapidly away and leaving the limestone unsupported, when it falls of its own weight.—After the falls recede about two miles farther, the shale will have disappeared below the level of the river, and consequently the water will descend over a solid wall of limestone; after this period the falls will recede only by the slow wearing of this rock.

The accompanying woodcut represents a section of the rocks at Lewiston. 1, the upper limestone; 2, shale; 3, limestone; 4, red marl and sandstone; 5, hard siliceous sandstone; 6, red marl. The surface of No. 1, at the top of the ridge, is worn and scratched, as if by the action of running water, carrying with it pebbles or hard materials. The shale, No. 2, is worn off at a gradual slope; the limestone, No. 3, has its projecting surface worn and scratched like the upper limestone. The hard sandstone, No. 5, projects much farther, and is also worn and scratched. At the termination of this stratum is a small valley, and beyond it a large mound of fragments of the sandstone and two limestones; the former most abundant. These fragments

1838
Hall

are thrown together in the greatest confusion, and bear conclusive evidence of the action of a powerful current. Dr. Scovill has erected a large house and several other buildings on the top of this elevation, (A), from the imbedded masses; a well was dug seventy feet deep in the same place, without finding the termination of the deposit. Since the period of this deposition, the river has been reduced to narrower limits, and has worn its channel in the strata here represented.

Between the falls and Lake Erie are several islands, composed chiefly of pebbles, gravel, clay and sand. Among these is Goat Island, which divides the waters of the river, making the two falls, one on the Canadian, the other on the American side.

The accompanying woodcut represents a section on the southwest side of this island; the height above the river at this place is about 20 feet. The coarse gravel and pebbles forming the upper part of this island are filled with shells of Unios, Melania, Planorbis, and Lymorea, the same species as those now inhabiting the lake. The elevation of the part of the island containing shells, proves that at a former period the waters were at a much higher level than at present. In order to raise the river to that height, it would require the falls to be carried towards Lewiston more than a mile.

1838
Vanuxem

VANUXEM, LARDNER. Second annual report of the geological survey of the third district of the state of New York. 1838. P. 271.

Describes the crystallization between the layers of Niagara limestone.

In the limestone at the Falls of Niagara, and of numerous other places, and in some of the water limes below that limestone, there is at the separation of the layers a singular columnar appearance, presenting itself at right angles to the layers, extending unequally as to length, bearing no small resemblance to the sutures of the scull, When examined they show the impress of a parallel fibrous or striated appearance, which is almost invariably covered with minute scales of coaly matter. In vain I sought last year for the cause of this common appearance. In

examining the upper layers of the water lime in Herkimer, the difficulty was solved; specimens were discovered with the striae, and with carbonate of lime in minute fibres as to thickness, but not in length, clearly proving that the phenomena in question was caused by the crystallization of a saline substance in fibrous crystals at the joints of the rock, analagous to those beautiful productions which all are familiar with, namely, the congelation or crystallization of water in loose and spongy soils. This explanation meets its confirmation in a specimen recently examined, which I brought last year from the Falls of Niagara, in which the striated appearance is finely exhibited, the specimen being exceedingly fresh and unaltered; on the top of the black or carbonaceous coating there are two small groups of fibrous sulphate of magnesia, which the force of crystallization has ejected since being in the cabinet, to the height of a quarter of an inch, and for want of a support the ends coil over, as we find in the black part of the banks of our ditches and other low grounds. 1838 Vanuxem

1839

HAYES, GEORGE E. Remarks on the geology and topography of western New York. (Am. jour. of sci., Jan. 1839. 35:86–105.) 1839 Hayes

Deals with the geological history and formation of western New York. The origin of the cataract and the old gorge are described and the recession of the cataract is discussed.

1841

BLACKWELL, E. R. *and* ALLEN, Z. On the volume of the Niagara river, as deduced from measurements made in 1841 by Mr. E. R. Blackwell and calculated by Z. Allen. (Am. jour. sci., (Oct.–Dec. 1843) 46:67–73.) 1841 Blackwell & Allen

From these calculations it appears, "that the motive power of the cataract of Niagara exceeds by nearly forty-fold all the mechanical force of water and steam power, rendered available in Great Britain, for the purpose of imparting motion to the machinery that suffices to perform the manufacturing labors for a large portion of the inhabitants of the world, including also the power applied for transporting the products by steam-

1841
Blackwell & Allen

boats and their steam-ships of war to the remotest seas." The law of gravity, "puts forth in this single waterfall more intense and effective energy, than is necessary to move all the artificial machinery of the habitable globe."

1841
Hall

HALL, JAMES. (On the geology of the region of Niagara Falls.) (Proc. Bost. Soc. of Nat. Hist. Boston: 1844. 1:52.)

Report of verbal statements made by Professor Hall at the meeting of the society in December 1841, regarding the geology of the Niagara region. The report states that "He alluded more particularly to the retrocession of the Falls; the supposed fault of Professor Daubeny at Lewiston; the formation for a space of 16 miles between Erie and Ontario until recently undetermined,— and the discovery of a fresh water formation along the banks of the river, and on Goat Island."

1841
Lyell

LYELL, *Sir* CHARLES. Travels in North America, in the years 1841–2; with geological observations on the United States, Canada, and Nova Scotia. N. Y.: Wiley and Putnam. 1845. 1:22–43.

The author, one of the most eminent of English geologists, visited the Falls in 1841. His account while most satisfactory from a scientific standpoint is also popular in presentation, clear and simple in style, in short, fascinating and well written. The frontispiece of volume I is a "Bird's-eye View of the Falls of Niagara & Adjacent Country Coloured Geologically," (conventionalized); opposite page 29 is a fac-simile of the Hennepin view, and scattered through the book are various diagrams showing geological formations, etc.

Aug. 27.—We first came in sight of the Falls of Niagara when they were about three miles distant. The sun was shining full upon them — no building in view — nothing but the green wood, the falling water, and the white foam. At that moment they appeared to me more beautiful than I had expected, and less grand; but after several days, when I had enjoyed a nearer view of the two cataracts, had listened to their thundering sound, and gazed on them for hours from above and below, and had watched the river foaming over the rapids, then plunging headlong into the dark pool,— and when I had explored the delightful island which divides the falls, where the solitude of the ancient forest is still unbroken, I at last learned by degrees to comprehend the wonders of the scene, and to feel its full magnificence.

Early in the morning after our arrival, I saw from the window of our hotel, on the American side, a long train of white vapoury clouds hanging over the deep chasm below the falls. They were slightly tinted by the rays of the rising sun, and blown slowly northwards by a gentle breeze from the pool below the cataract, which was itself invisible from this point of view. No fog was rising from the ground, the sky was clear above; and as the day advanced, and the air grew warm, the vapours all disappeared. 1841 Lyell

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. . . the Falls of Niagara teach us not merely to appreciate the power of moving water, but furnish us at the same time with data for estimating the enormous lapse of ages during which that force has operated. A deep and long ravine has been excavated, and the river has required ages to accomplish the task, yet the same region affords evidence that the sum of these ages is as nothing, and as the work of yesterday, when compared to the antecedent periods, of which there are monuments in the same district.

It has long been a favourite subject of discussion whether the Falls were once situated seven miles farther north, or at Queenston. The ideal bird's-eye view given in the frontispiece may assist the reader who has not visited the spot to form a tolerably correct general notion of the geographical configuration of this country, which is very simple. The view has been constructed from a sketch published by Mr. Bakewell, in Loudon's Magazine for 1830, into which the geological representation of the rocks, as they appear on the surface and in the ravine of the Niagara, has been introduced from the State Survey by Mr. Hall. The platform, in a depression of which Lake Erie is situated, is more than 330 feet above Lake Ontario, and the descent from a higher to a lower level is sudden and abrupt at the escarpment called the Queenston heights. The strata throughout this whole region are nearly horizontal, but they have a gentle dip to the south of 25 feet in a mile. This inclination is sufficient to cause the different groups of rock to crop out one

1841
Lyell

from beneath the other, or come up to the surface in parallel zones, which may be traced for a great distance east and west through the state of New York and Canada. (See Map.) They all consist of different members of the Silurian series, the uppermost or newest being those nearest to Lake Erie. (See section fig. 4, p. 37.) In the bird's-eye view, the Niagara is seen bounded by low banks where it issues from Lake Erie, and varying in width from one to three miles. It here resembles a prolongation of the tranquil lake, being interspersed with low wooded islands. This lake-like scenery continues for about fifteen miles, during which the fall of the river scarcely exceeds as many feet, but on reaching the rapids, it descends over a limestone bed about 50 feet in less than a mile, and is then thrown down about 165 feet perpendicularly at the Falls. The largest of these, called the Horseshoe Fall, is 1800 feet, or more than a third of a mile, broad, the island in the midst somewhat less in width, and the American Fall about 600 feet wide. The deep narrow chasm below the great cataract is from 200 to 400 yards wide, and 300 feet deep; and here in seven miles the river descends 100 feet, at the end of which it emerges from the gorge into the open and flat country, so nearly on a level with Lake Ontario that there is only a fall of about four feet in the seven additional miles which intervene between Queenston and the Lake. The great ravine is winding, and makes a turn nearly at right angles to itself at the whirlpool, where the Niagara sweeps round a large circular basin. . . . At some points the boundary cliffs are undermined on one side by the impetuous stream, but there is usually a talus at the base of the precipice, supporting a very ornamental fringe of trees.

It has long been the popular belief, from a mere cursory inspection of this district, that the Niagara once flowed in a shallow valley across the whole platform from the present site of the Falls to the Queenston heights, where it is supposed the cataract was first situated, and that the river has been slowly eating its way backwards through the rocks for a distance of seven miles.

According to this hypothesis, the Falls must have had originally nearly twice their present height, and must have been always diminishing in grandeur from age to age, as they will continue to do in future so long as the retrograde movement is prolonged. It becomes, therefore, a matter of no small curiosity and interest to inquire at what rate the work of excavation is now going on, and thus to obtain a measure for calculating how many thousands of years or centuries have been required to hollow out the chasm already excavated. 1841 Lyell

It is an ascertained fact, that the Falls do not remain absolutely stationary at the same point of space, and that they have shifted their position slightly during the last half century. Every observer will also be convinced that the small portion of the great ravine, which has been eroded within the memory of man, is so precisely identical in character with the whole gorge for seven miles below, that the river supplies an adequate cause for executing the task assigned to it, provided we grant sufficient time for its completion.

The waters, after cutting through strata of limestone, about fifty feet thick in the rapids, descend perpendicularly at the Falls over another mass of limestone about ninety feet thick, beneath which lie soft shales of equal thickness, continually undermined by the action of the spray driven violently by gusts of wind against the base of the precipice. In consequence of this disintegration, portions of the incumbent rock are left unsupported, and tumble down from time to time, so that the cataract is made to recede southwards. The sudden descent of huge rocky fragments of the undermined limestone at the Horseshoe Fall, in 1828, and another at the American Fall, in 1818, are said to have shaken the adjacent country like an earthquake. According to the statement of our guide in 1841, Samuel Hooker, an indentation of about forty feet has been produced in the middle of the ledge of limestone at the lesser fall since the year 1815, so that it has begun to assume the shape of a crescent, while within the same period the Horseshoe Fall has been altered so as less to

1841
Lyell

deserve its name. Goat Island has lost several acres in area in the last four years, and I have no doubt that this waste neither is, nor has been, a mere temporary accident, since I found that the same recession was in progress in various other waterfalls which I visited. . . . Mr. Bakewell calculated that, in the forty years preceding 1830, the Niagara had been going back at the rate of about a yard annually, but I conceive that one foot per year would be a much more probable conjecture, in which case 35,000 years would have been required for the retreat of the Falls from the escarpment of Queenston to their present site, if we could assume that the retrograde movement had been uniform throughout. This, however, could not have been the case, as at every step in the process of excavation the height of the precipice, the hardness of the materials at its base, and the quantity of fallen matter to be removed, must have varied. At some points it may have receded much faster than at present, at others much slower, and it would be scarcely possible to decide whether its average progress has been more or less rapid than now.

Unfortunately our historical evidence of the former condition of the cataract is meagre and scanty in the extreme. Sixty years ago, the whole district between Lakes Erie and Ontario was a wilderness in which the Indian hunter chased the bear and the buffalo. When at Boston, my attention was called by Mr. Ingraham to a work translated from the original French of Father Hennepin, a missionary who gave a description of the grand cataract and a plate of it, as it appeared in the year 1678. It is not wonderful that coming suddenly upon the Falls which no European traveller had ever seen before, he should have believed them to be twice their real height. "Betwixt the lakes Ontario and Erie," he says, "there is a vast and prodigious cadence of water, which falls after an astonishing manner, insomuch that the universe does not afford its parallel. As to the waters of Italy and Swedeland, they are but sorry patterns of it, and this wonderful downfall is compounded of two great falls, with an isle in the middle, and there is another cascade less than the other

two which falls from west to east. I wished a hundred times that somebody had been with us, who could have described the wonders of this frightful fall. In the mean time, accept the following draught such as it is."— From his plate it appears that this third cascade was produced by what he terms " the elbow " caused by the projection of the table rock, which must then have been more prominent than now. 1841 Lyell

Seventy-three years afterwards, or in 1751, a letter was published in the Gentleman's Magazine for that year by Kalm, the Swedish botanist, on the Falls of Niagara. His description is also illustrated by a plate, in which the proportional height and breadth of the Falls are given more correctly. The lesser Fall on the left bank of the river is omitted; but at the place where it had been represented in Father Hennepin's sketch, Kalm inserts the letter " *a*," referring to a note in which he says, " Here the water was formerly forced out of its direct course by a projecting rock, which when standing turned the water off obliquely across the other Fall."

This observation confirms the reality of Hennepin's oblique cascade, and shows that some waste had been going on in the intermediate seventy-three years, making a visible alteration in the scene, and leading us to infer that the rocks have been suffering continual dilapidation for more than the last century and a half.

In the absence of more ample historical data, we are fortunately not without geological evidence of the former existence of a channel of the Niagara at a much higher level, before the table-land was intersected by the great ravine. Long before my visit to the Niagara, I had been informed of the existence on Goat Island of beds of gravel and sand containing fluviatile shells, and some account had been given of these by Mr. Hall in his first report in 1839; I therefore proposed to him that we should examine these carefully, and see if we could trace any remnants of the same along the edges of the river-cliffs below the Falls. We began by collecting in Goat Island shells of the

1841 Lyell

genera *Unio*, *Cyclas*, *Melania*, *Valvata*, *Limnea*, *Planorbis*, and *Helix*, all of recent species, in the superficial deposit. They form regular beds, and numerous individuals of the *Unio* and *Cyclas* have both their valves united. We then found the same formation exactly opposite to the Falls on the top of the cliff on the American side, where to river-terraces, one twelve and the other twenty-four feet above the Niagara, have been cut in the modern deposits. In these we observed the same fossil shells as in Goat Island, and learnt that the teeth and other remains of a mastodon, some of which were shown us, had been found thirteen feet below the surface of the soil. We were then taken by our guide to a spot farther north, where similar gravel and sand with fluviatile shells occurred near the edge of the cliff overhanging the ravine, resting on the solid limestone. It was about half a mile below the principal Fall, and extended at some points 300 yards inland, but no farther, for it was then bounded by the bank of more ancient drift. This deposit precisely occupies the place which the ancient bed and alluvial plain of the Niagara would naturally have filled, if the river once extended farther northwards, at a level sufficiently high to cover the greater part of Goat Island. At that period the ravine could not have existed, and there must have been a barrier, several miles lower down, at or near the whirlpool.

The supposed original channel, through which the waters flowed from Lake Erie to Queenston or Lewiston, was excavated chiefly, but not entirely, in the superficial drift, and the old river-banks cut in this drift are still to be seen facing each other, on both sides of the ravine, for many miles below the Falls. A section of Goat Island from south to north, or parallel to the course of the Niagara, shows that the limestone had been greatly denuded before the fluviatile beds were accumulated, and consequently when the Falls were still several miles below their present site. From this fact I infer that the slope of the river at the rapids was principally due to the original shape of the old channel, and not, as some have conjectured, to modern erosions on the approach of the Falls to the spot.

The observations made in 1841 induced me in the following year (June, 1842), to re-examine diligently both sides of the river from the Falls to Lewiston and Queenston, to ascertain if any other patches of the ancient river-bed had escaped destruction. Accordingly, following first the edge of the cliffs on the eastern bank, I discovered, with no small delight, at the summer-house above the whirlpool, a bed of stratified sand and gravel, forty feet thick, containing fluviatile shells in abundance. Fortunately, a few yards from the summer-house a pit had been recently dug for the cellar of a new house to the depth of nine feet in the shelly sand, in which I found shells of the genera *Unio*, *Cyclas*, *Melania*, *Helix*, and *Pupa*, not only identical in species with those which occur in a fresh state in the bed of the Niagara, near the ferry, but corresponding also in the proportionate number of individuals belonging to each species, the valves of *Cyclas similis*, for example, being the most numerous. The same year I found also a remnant of the old river-bed on the opposite or Canadian side of the river, about a mile and a half above the whirlpool, or two miles and a half below the Falls. These facts appear conclusive as to the former extension of a more elevated valley, four miles, at least, below the Falls; and at this point the old river-bed must have been so high as to be capable of holding back the waters which covered all the patches of fluviatile sand and gravel, including that of Goat Island. As the table-land or limestone-platform rises gently to the north, and is highest near Queenston, there is no reason to suppose that there was a greater fall in the Niagara when it flowed at its higher level, than now between Lake Erie and the Falls; and according to this view, the old channel might well have furnished the required barrier.

1841 Lyell

I have stated that on the left, or Canadian bank of the Niagara, below the Falls, I succeeded in detecting sand with freshwater shells at one point only, near the mouth of the muddy river. The ledge of limestone on this side is usually laid bare,

1841
Lyell

or only covered by vegetable mould, until we arrive at the boulder clay, which is sometimes within a few yards of the top of the precipice, and sometimes again retires eighty yards or more from it, being from twenty to fifty feet in height. I also found an old river-bed running through the drift parallel to the Niagara, its course still marked by swamps and ponds, such as we find in all alluvial plains, and only remarkable here because the river now runs at a lower level by 300 feet. This deserted channel occurs between the Muddy River and the Whirlpool, and is 100 yards broad.

There is also a notch or indentation, called the "Devil's Hole," on the right or eastern side of the Niagara, half a mile below the Whirlpool, which deserves notice, for there, I think, there are signs of the Great Cataract having been once situated. A small streamlet, called the "Bloody Run," from a battle fought there with the Indians, joins the Niagara at this place, and has hollowed out a lateral chasm. Ascending the great ravine, we here see, facing us, a projecting cliff of limestone, which stands out forty feet beyond the general range of the river cliff below, and has its flat summit bare and without soil, just as if it had once formed the eastern side of the Great Fall.

By exploring the banks of the Niagara above the Falls, I satisfied myself that if the river should continue to cut back the ravine still farther southwards, it would leave here and there, near the verge of the precipice and on its islands, strata of sand and loam, with freshwater shells similar to those already described. I collected fossil shells, for example, on the left bank, near the Chippewa River, and learnt that others had been reached, in sinking a well, in 1818, at the south-east end of Grand Island. . . .

The patches of fluviatile strata, therefore, occurring between the old banks of drift and the precipice, and not having been met with on other parts of the platform at a distance from the Niagara, confirm the theory, previously adopted on independent evidence, of the recession of the Falls from Queenston south-

wards. The narrowness of the gorge near Queenston, where it is just large enough to contain the rapid current of water, accords well with the same hypothesis, and there is no ground for suspecting that the excavation was assisted by an original rent in the rocks, because there is no fissure at present in the limestone at the Falls, where the moving waters alone have power to cut their way backwards. 1841 Lyell

I have already remarked that there will always be insuperable difficulties in the way of estimating with precision the rate of the retrogression of the Falls in former ages, because at every step new strata have been successively exposed at the base of the precipice. According to their softer or harder nature, the undermining process must have been accelerated or retarded. This will be understood by reference to the annexed section (fig. 4), where the line *b*, *c*, *d*, represents the present surface of the river along which the Falls have receded. The strata (1, 3, and 7) are of soft materials; the others, (2, 4, and 8), which slightly project at their termination in the escarpment, are of a more compact and refractory kind. It has been necessary to exaggerate the southward dip of the strata in this diagram, which is in reality so slight as to be insensible to the eye, being only, as before mentioned, about twenty-five feet in a mile, the river channel sloping in an opposite direction at the rate of fifteen feet in a mile. These two inclinations, taken together, have caused, as Mr. Hall has pointed out in his Survey, a diminution of forty feet in the perpendicular height of the Falls for every mile that they receded southward. By reference to the section, the reader will perceive that when they were situated at the Whirlpool (*c*), the quartzose sandstone (2), which is extremely hard, was at the base of the precipice, and here the Great Cataract may have remained nearly stationary for ages.

In regard to the future retrocession of the Falls, it will be perceived by the same section (fig. 4), that when they have travelled back two miles, or to *i*, *k*, the massive limestone (8),

1841 Lyell

now at the top of the Falls, will then be at their base; and its great hardness may, perhaps, effectually stop the excavating process, if it should not have been previously arrested by the descent of large masses of the same rock from the cliff above. It will also appear that the Falls will continually diminish in height, and should they ever reach Lake Erie, they will intersect entirely different strata from those over which they are now thrown.

The next inquiry into which we are naturally led by our retrospect into the past history of this region, relates to the origin of the Falls. If they were once seven miles northward of their present site, in what manner, and at what geological period, did they first come into existence? In tracing back the series of past events, we have already seen that the last change was the erosion of the great ravine; previously to which occurred the deposition of the freshwater deposit, including fossil shells of recent species, and the bones of the Mastodon. Thirdly, of still older date was the drift or boulder formation which overspreads the whole platform and the face of the escarpment near Queenston, as well as the low country between it and Lake Ontario. Fourthly, the denudation of the line of cliff or escarpment, in which the table-land ends abruptly, preceded the origin of the drift. I shall endeavour to show, in a subsequent chapter, when speaking of Canada, that this drift was of marine origin, and formed when the whole country was submerged beneath the sea. In the region of the Niagara it is stratified, and though no fossils have as yet been detected in it, similar deposits occur in the valley of the St. Lawrence at Montreal, at a height nearly equal to Lake Erie, where fossil shells, of species such as now inhabit the northern seas, lie buried in the drift.

It is almost superfluous to affirm that a consideration of the geology of the whole basin of the St. Lawrence and the great lakes can alone entitle us to speculate on the state of things which immediately preceded or accompanied the origin of the Great Cataract. To give even a brief sketch of the various phenomena to which our attention must be directed, in order to solve this

curious problem, would require a digression of several chapters. 1841
At present the shortest and most intelligible way of explaining Lyell
the results of my observations and reflections on this subject will be to describe the successive changes in the order in which I imagine them to have happened. The first event then to which we must recur is the superficial waste or denudation of the older stratified rocks (from 1 to 10 inclusive, section, fig. 4, p. 37), all of which had remained nearly undisturbed and horizontal from the era of their formation beneath the sea to a comparatively modern period. That they were all of marine origin is proved by their imbedded corals and shells. They at length emerged slowly, and portions of their edges were removed by the action of the waves and currents, by which cliffs were formed at successive heights, especially where hard limestones (such as Nos. 10 and 8, fig. 4) at Blackrock and Lewiston, were incumbent on soft shales. After this denudation the whole region was again gradually submerged, and this event took place during the glacial period, at which time the surfaces of the rocks already denuded were smoothed, polished, and furrowed by glacial action, which operated successively at different levels. The country was then buried under a load of stratified and unstratified sand, gravel, and erratic blocks, occasionally 80, and in some hollows more than 300, feet deep. An old ravine terminating at St. David's, which intersects the limestone platform of the Niagara, and opens into the great escarpment, illustrates the posteriority of this drift to the epoch when the older rocks were denuded. The period of submergence last alluded to was very modern, for the shells then inhabiting the ocean belonged, almost without exception, to species still living in high northern, and some of them in temperate, latitudes. The next great change was the re-emergence of this country, consisting of the ancient denuded rocks, covered indiscriminately with modern marine drift. The upward movement by which this was accomplished was not sudden and instantaneous, but gradual and intermittent. The pauses by which it was interrupted are marked by ancient beach-lines,

1841
Lyell

ridges, and terraces, found at different heights above the present lakes. These ridges and terraces are partly due to the denudation and re-arrangement of the materials of the drift itself, which had previously been deposited on the platform, the sloping face of the escarpments, and in the basins of the great lakes.

As soon as the table-land between Lakes Erie and Ontario emerged and was laid dry, the river Niagara came into existence, the basin of Lake Ontario still continuing to form part of the sea. From that moment there was a cascade at Queenston of moderate height, which fell directly into the sea. The uppermost limestone and subjacent slate (8 and 7, fig. 4, p. 37) being exposed, the cataract commenced its retrograde course, while the lower beds in the escarpment (from 6 to 1) were still protected from waste by remaining submerged. A second fall would in due time be caused by the continued rise of the land and the exposure of the hard beds (6 and 4), constituting what is called the Clinton group, together with the soft and easily undermined red shale (3), on which they repose. Finally, a third cascade would in all likelihood be produced by the rise of another hard mass, the quartzose sandstone (2, fig. 4) resting on very destructible red shale (1). Three falls, one above the other, very similar in their geological and geographical position to those actually seen on the river Genesee at Rochester, would thus be formed. The recession of the uppermost must have been gradually retarded by the thickening of the incumbent limestone (No. 8, fig. 4), in proportion as the Falls sawed their way southwards. By this means the second cataract, which would not suffer the same retardation, might overtake it, and the two united would then be retarded by the large quantity of rock to be removed, until the lowest fall would come up to them, and then the whole would be united into one.

The principal events enumerated in the above retrospect, comprising the submergence and re-emergence of the Canadian lake district and valley of the St. Lawrence, the deposition of fresh-water strata, and the gradual erosion of a ravine seven miles long,

are all so modern in the earth's history as to belong to a period when the marine, the fluviatile, and terrestrial shells, were the same, or nearly the same, as those now living. Yet if we fix our thoughts on any one portion of this period — on the lapse of time, for example, required for the recession of the Niagara from the escarpment to the Falls,— how immeasurably great will its duration appear in comparison with the sum of years to which the annals of the human race are limited! Had we happened to discover strata, charged with fluviatile shells of recent species, and enclosing the bones and teeth of a Mastodon, near a river at the bottom of some valley, we might naturally have inferred that the buried quadruped had perished at an era long after the canoes of the Indian hunter had navigated the North American waters. . . . But fortunately on the Niagara, we may turn to the deep ravine, and behold therein a chronometer measuring rudely, yet emphatically, the vast magnitude of the interval of years, which separate the present time from the epoch when the Niagara flowed at a higher level several miles further north across the platform. We then become conscious how far the two events before confounded together,— the entombment of the Mastodon, and the date of the first peopling of the earth by man,— may recede to distances almost indefinitely remote from each other.

1841 Lyell

But, however much we may enlarge our ideas of the time which has elapsed since the Niagara first began to drain the waters of the upper lakes, we have seen that this period was one only of a series, all belonging to the present zoological epoch; or marine, had already come into being. If such events can take place while the zoology of the earth remains almost stationary and unaltered, what ages may not be comprehended in those successive tertiary periods during which the Flora and Fauna of the globe have been almost entirely changed! Yet how subordinate a place in the long calendar of geological chronology do the successive tertiary periods themselves occupy! How

1841 Lyell

much more enormous a duration must we assign to many antecedent revolutions of the earth and its inhabitants! No analogy can be found in the natural world to the immense scale of these divisions of past time, unless we contemplate the celestial spaces which have been measured by the astronomer. Some of the nearest of these within the limits of the solar system, as, for example, the orbits of the planets, are reckoned by hundreds of millions of miles, which the imagination in vain endeavours to grasp. Yet one of these spaces, such as the diameter of the earth's orbit, is regarded as a mere unit, a mere infinitesimal fraction of the distance which separates our sun from the nearest star. By pursuing still farther the same investigations, we learn that there are luminous clouds scarcely distinguishable by the naked eye, but resolvable by the telescope into clusters of stars, which are so much more remote, that the interval between our sun and Sirius may be but a fraction of this larger distance. To regions of space of this higher order in point of magnitude, we may probably compare such an interval of time as that which divides the human epoch from the origin of the coralline limestone over which the Niagara is precipitated at the Falls. Many have been the successive revolutions in organic life, and many the vicissitudes in the physical geography of the globe, and often has sea been converted into land, and land into sea, since that rock was formed. The Alps, the Pyrenees, the Himalaya, have not only begun to exist as lofty mountain chains, but the solid materials of which they are composed have been slowly elaborated beneath the sea within the stupendous interval of ages here alluded to.

The geologist may muse and speculate on these events until, filled with awe and admiration, he forgets the presence of the mighty cataract itself, and no longer sees the rapid motion of its waters, nor hears their sound, as they fall into the deep abyss. But whenever his thoughts are recalled to the present, the tone of his mind,— the sensations awakened in his soul, will be found

to be in perfect harmony with the grandeur and beauty of the glorious scene which surrounds him. 1841 Lyell

VESPUCIUS, *pseud.* Geological phaenomena of the Falls of Niagara. (Christian observ., Sept. 1841. 41:530–538.) 1841 Vespucius

The article consists for the most part of quotations from Fairholme and Dwight.

VESPUCIUS, *pseud.* Geological phaenomena of the Falls of Niagara. (Mus. for. lit., 1841. 43 (n. ser. 15): 435–440.)

From the *Christian Observer.*

1842

HALL, JAMES. Niagara Falls — their physical changes, and the geology and topography of the surrounding country. (Bost. jour. nat. hist., Jan. 1842. 4:106–34.) 1842 Hall

HALL, JAMES. Niagara Falls; their physical changes, and the geology and topography of the surrounding country. Bost.: 1844.

Printed originally in the Boston Journal of Natural History. 4:106–134.

LYELL, *Sir* CHARLES. A memoir on the recession of the Falls of Niagara. (Proc. Geol. Soc. of London. 1842. 3:595–602.) 1842 Lyell

"The contents of the memoir may be divided into two parts: I. An account of the successive strata of the Niagara district, and II. a description of the phaenomena exhibited by the Falls."

Summary of Mr. Lyell's memoir on the Falls. . . . (Proc. Geol. Soc. of London. 1842–43. 4:19–22.) 1842

1843

HALL, JAMES. Niagara Falls; its past, present and prospective condition. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: 1892. Pp. 67–89.) 1843 Hall

Taken from the Final Report of the Fourth Geological District of the State of New York, 1843.

HALL, JAMES. Niagara Falls, its past, present, and prospective condition. (Geology of N. Y. pt. 4, Fouth geological dis't. Pp. 383–401.)

1843
Hall

The author does not accept the theory that the gorge may have been due to dislocation of the strata or worn by action of the sea. "Both in relation to the former condition and the future recession of the falls, we may regard the problem as undecided with respect to time. . . . The conclusion then, seems inevitable, that the river has been the great agent in excavating its own channel, from near the escarpment between Lewiston and Queenston, to the present position of the cataract; that the recession has been aided by the character of the rocks, presenting alternate hard and soft strata; and that descent was overcome, not by one perpendicular fall but by several."

The article goes on to cite the historical evidence furnished by the accounts of various travelers in support of the recession of the Falls. The existence of fresh-water deposits on Goat Island is effectively used in aid of the conclusions regarding the recession of the Falls.

". . . I am fully convinced from the facts presented, that the existence of the falls and the Niagara river in the present position, is of very recent date geologically."

The discussion of the future of the Falls is not very satisfactory owing to the lack of data at the time. The account is accompanied by a stereotyped bird's-eye view of the river and the Falls and by a facsimile of the Hennepin view. There are also several diagrams showing the strata.

HALL, JAMES. Trignometrical survey and map of Niagara Falls. (Geology of N. Y., pt. 4. Fourth geological dis't. Pp. 402–404.)

This is the first of its kind, a point of departure for later surveys. It is based upon a careful survey made by Mr. Blackwell in 1841 and reviewed in 1842.

1847

1847
Bakewell

BAKEWELL, ROBERT. Observations on the whirlpool and the rapids below the falls of Niagara. (Am. jour. sci. 2d ser. 1847. 4:25–36.)

The author, an Englishman, spent six days at Niagara in 1829, and eight days in 1846, studying the geology and physical features of the vicinity. His work is valuable from his ability to compare the results of his own observations made on these two visits seventeen years apart. This paper contains curious illustrations which "are designed to account for the origin of both" whirlpool and rapids.

1847

The geology of Niagara Falls. (Chambers' jour., Oct. 9, 1847. 8:229–231.)

A brief study based on Bouchette, Hall, and Lyell.

1850

JOHNSTON, JAMES FINLAY WEIR. Notes on North America; agricultural, economical and social. Bost.: C. C. Little and J. Brown. Edinburgh and Lond.: W. Blackwood and Sons. 1851. 1:247–258. **1850** Johnston

Part of the country through which the railway [from Buffalo] conducted us on our way to Niagara was still uncleared or unstumped, and sprinkled with log-huts and apparently poor settlers, surrounded by indifferent crops of Indian corn, on soils evidently better adapted for wheat. We cross again, on this route, the belt of flat wheat-land, belonging to the Onondago salt and Niagara limestone groups, which, as I formerly stated, stretches beyond the Niagara River far into Canada. As seen here, it is a clayey region, on which the system of thorough-drainage is destined hereafter to produce most beneficial results. . . . This village of Niagara consists chiefly of hotels and churches; and the running of a morning and evening train to Buffalo is considered indispensable to the success of at least one of these sets of establishments.

. . . . .

In the afternoon, I went down to the Falls. I crossed over to the Canadian side, and spent several hours on the banks which overlook them. I afterwards walked to the suspension bridge a couple of miles below, which is itself a nervous thing to walk along, and from which the view of the Falls, and of the ravine, is striking and beautiful. The section of the strata, as seen at this place, is as follows:—

Limestone	Niagara group
Shale	
Limestone	Clinton group
Sandstone and thin clay marls, chiefly red.	Medina sandstone

This section is now well known, as well as the influence of the Niagara shale, in hastening the working back of the Great Falls. It illustrates, however, what I have had occasion to say in reference to the soils and geology of western New York. The

1850
Johnston

numerous layers of red clay marl, among the red rocks of the underlying Medina sandstone, are in conformity with the economically important observation, in reference to the agricultural value of this group of rocks, to which I adverted in the preceding chapter — that the poorer Medina sand-rock of the eastern counties of New York becomes more mixed with clay towards the west. Hence the rich soils to which it gives rise below the mouth of the Niagara River, and along the south-western borders of Lake Ontario, where it forms the surface of the country.

Above the Niagara limestone, rest the Onondaga salt rocks and their *debris;* and though these are spread over the surface of the country in the neighbourhood of the village of Niagara, they are not seen in the section of the ravine as it appears from the bridge, nor on the immediate banks of the river.

. . . . .

On the Canadian side of the Falls, a high bluff of red, probably drifted clay, rests above the Niagara limestone, forming an upland above the narrow fringe which separates it from the waters of the river above the Falls. Below the falls, this bluff retires to a considerable distance from the river, and the carriage-road to the suspension bridge runs along the surface of the nearly naked rock. When walking leisurely here, two things agree in forcing the same thought upon the imagination. Where it is completely uncovered, the whole upper surface of the limestone rock, on which we travel, exhibits evidence of the wearing action of the water. It has the same hollowed and irregular appearance as the surface above the falls, over which the water is now pouring. Over this, therefore, the river must formerly have run, before it ate out the deep ravine below. And, again, the retiring of the bluffs shows that it then, as we should suppose, had occupied a wider bed, and, as it now does above the Falls, had undermined the cliffs of clay, and bent its course now more to the one side, and now more to the other, as circumstances might direct. One reflects on such things, and in his closet makes cool calculations

of the lapse of time necessary to accomplish all this. But the greatness of the lapse is felt when we see before us the protracted effect, and the still living and acting cause. The foam of the cataract becomes, to the imagination, the hoary hair of thousands of years, and its perpetual rainbow a halo round the head of the sleepless spirit which has seen these changes and survived them all. 1850 Johnston

. . . . .

The fresh-water shells which occur in the deep bed of mixed slaty gravel and red clay drift, which covers the limestone rocks at the edge of the waterfall upon Goat Island, are now well known. The minute, almost microscopic species, I found very abundant in the clay. Besides the shells usually collected, I picked up a fragment of a fresh-water crustacean.

1851

SMITH, WILLIAM HENRY. Canada: past, present and future; being a historical, geographical, geological and statistical account of Canada west. Toronto: (1851.) 1:198–204. 1851 Smith

A short account by one evidently familiar with the literature of the subject and particularly interested in the geology of the Falls.

1853

DESOR, E————. (Ueber Niagara Falls.) (Geologische gesellschaft. Seitschrift. Sept. 1853. Ed. 5. Pp. 643–644.) (Abstract.) 1853 Desor

This paper deals with the recession of the Falls, which the author estimates to be less than it is estimated by either Bakewell or Lyell.

1854

Variations in the level of the lakes. (Can. jour., Jan. 1854. 2:129.) 1854

Gives the volume of the Falls as estimated by Barrett at Black Rock.

1855

DESOR, E. The falls of Niagara and their retrograde movement. . . . tr. by J. D. Meredith. (Pottsville scientific association. Pottsville, Penn.: Bulletin, Jan. & Feb. 1855. Pp. 5–10.) 1855 Desor

1855
Desor

A translation taken from the Proceedings of the Academy of Natural Sciences of Neuchatel, 1854. It reviews the opinions of other writers on Niagara, discusses the future of the Falls and gives a chart and cross-sections.

In fine, the retrocession of the Falls of Niagara, however rapid it may appear to us, is not the less the effect of a slow action, like all the grand operations of nature. I believe that we shall be within the bounds of truth by applying the figure of annual retrogradation popularly adopted, to centuries.

It surely is nearer fact, to estimate the Southern movement of the Niagara cataract at three feet in a century, rather than at three feet in a year.

. . . . .

We then conclude that with Mr. Hall and with more reason than he, not only that there is nothing to fear for Lake Erie, but that notwithstanding the far-fetched calculations and predictions of the white man, Niagara, in his time will lose none of its height, none of its majestic beauty, but will continue to be for ages what it has been from all time for the red man, who wandered of yore on its banks, the most magnificent of cataracts — the thunderer of waters. The volume of its flood may in the course of time undergo some diminution, which cannot then be a subject of regret, as it will be caused by the extension of agriculture and civilization in the basin of the great Lakes, and from the vast marshes which feed the sources of Lake Superior, giving place to the softer features of cultivated fields and productive lands.

1856

1856
Gibbes

GIBBES, L. R. Remarks on Niagara Falls. (Proc. .A. A. A. S. (Aug. 1856.) 1857. 10:pt. 2, 69–78.)

Written in the form of a letter addressed to Professor James Hall, president of the association. The letter deals with Desor's views on the recession of the Falls and the duration of such recession, and offers the theory of "unequal resistance" as an explanation of the "inequalities of recession."

HALL, JAMES. Note [on recession of Niagara Falls.] (Proc. A. A. A. S. (Aug. 1856.) 1857. 10:pt. 2, 76–78.) 1856 Hall

Professor Hall's note is appended to the letter of Professor Gibbes, with his review of Professor Gibbes's theories.

1857

BAKEWELL, R. Observations on the Falls of Niagara, with reference to the changes which have taken place and are now in progress. (Am. jour. sci., 1857. 73:85–95.) 1857 Bakewell

The author visited the Falls in the years 1829, 1846, 1851, and 1856 and made many sketches at different intervals. Changes which he observed convinced him that there was a slow onward retrocession of the Falls and that the cataract had once poured over the precipice at Lewiston. He gives facts to show "that the probabilities are, that the American Fall is comparatively a recent diversion from the main channel." By reference to his sketches he shows "that there is a gradual and perceptible change going on, drawing the waters from the Canada to the American side, or rather, to the center of the fall."

GIBBES, L. R. On some points which have been overlooked in the past and present condition of Niagara Falls. Charleston: 1857. 1857 Gibbes

This paper is printed in the Proceedings of the Elliot Society of Natural History of Charleston, S. C., volume I, pp. 91–100. The author discusses the rate of recession of the two falls. He does not believe it possible to estimate closely the rate of recession, but seeks to prove that the recession of "the Canadian Fall is not less than fifteen times greater than that of the American Fall, in the same time," and, "that it is probable that the ratio of recession in the two Falls is greater than that of their volumes of water."

1859

RAMSAY, *Sir* ANDREW C. On some of the glacial phaenomena of Canada and the northeastern provinces of the United States during the drift period. (Proc. Geol. Soc. of London. Quarterly jour. 1859. 15:200–215.) 1859 Ramsay

This paper, which was read May 12, 1858, discusses the probable date of the origin of Niagara Falls and the drift and other late tertiary deposits. The author feels that possibly "the approximate period of 35,000 years given by Sir Charles Lyell for the erosion of the gorge

1859 Ramsay

is below the reality," but says he has "little to add to the account of the Later Tertiaries of Niagara given by Sir Charles Lyell and Professor Hall."

1864

1864 Campbell

CAMPBELL, JOHN FRANCIS. A short American tramp in the fall of 1864. Edinb.: Edmondston and Douglas. 1865. Pp. 228–264.

A delightful geological study in nontechnical terms by a wide-awake tourist. His conclusions from sands and scratches on Goat Island are interesting.

1865

1865 Marcou

MARCOU, JULES. Le Niagara quinze ans après. (Extrait du Bulletin de la Société–Géologique de France. 2e série XXII. P. 190. 6 Mars. 1865.)

1869

1869 Hyatt

HYATT, ALPHEUS. Rock ruins. [Niagara Falls.] (Am. nat., April, 1869. 2:77–85.)

The author uses the Falls of Niagara as a concrete example of the effect of water upon rock masses. He describes the rock formation at Niagara, gives an account of the various well-known "Falls of Rock," and reviews the theories of Hall and Lyell as to the recession of the Falls and their future.

1872

1872 Gunning

GUNNING, W. D. The past and future of Niagara. (Pop. sci. mo., Sept., 1872. 1:564–573.)

Written after the survey of 1842 and discusses the evidences of and reasons for recession together with the significance of the geology and topography of the region.

1873

1873 Holley

HOLLEY, GEORGE W. The proximate future of Niagara in review of Professor Tyndall's lecture thereon. (Proc. A. A. A. S. (Aug., 1873.) 1874. 22:pt. 2 147–155.)

A review of Tyndall's opinions and statements, from many of which the author differs, and on pages 151–152 a description of the "Formation — the topography of the river bottom" as revealed to observers in March, 1848, when the ice dammed the river so effectually. Professor Tyndall's prediction that the American channel will be eventually dry and used for

agricultural purposes, is shown to be baseless, on account of the rock formation. The author says that the " character of the river bed and not the depth of water solves the problem of recession, and that will determine both the proximate and distant future of Niagara, so far as its location is concerned." 1873 Holley

TYNDALL, JOHN. Niagara. (Every Sat., May 31, 1873. 14:595–601.) 1873 Tyndall

The discourse delivered before the Royal Institution April 4, 1873, quoted from *Macmillan's Magazine.*

TYNDALL, JOHN. Niagara. (Lit. liv. age, June 7, 1873. 117: 609-619.)

Quoted from *Macmillan's Magazine.*

TYNDALL, JOHN. Niagara Falls. (Critic, July, 1873. 81:24–35.)

The discourse delivered before the Royal Institution, April 4, 1873, and reprinted from *Macmillan's Magazine.*

TYNDALL, JOHN. Niagara Falls: past and future. (*In* Williams, J. David, ed. America, illustrated. N. Y.: The Arundel print. n. d. Pp. 81–85.)

Professor Tyndall's article, "A Philosophical Disquisition" as it is called, presents very briefly and simply some observations on the recession of the Falls and the physics or excavation revealed by the Niagara gorge. The article is accompanied by an interesting " Night View of Niagara in Olden Times."

TYNDALL, JOHN. Some observations on Niagara. (Pop. sci. mo., June, 1873. 3:210–226.)

A lecture before the Royal Institution, April 4, 1873.

1875

BELT, THOMAS. . . . Niagara: glacial and post-glacial phenomena. (Quarterly jour. sci. Lond.: April, 1875. Pp. 135–156.) 1875 Belt

The author gives arguments in favor of his theory, that " the gorge was cut back from the whirlpool up to at least within three-quarters of a mile from the falls before the glacial period." He thinks that " it may have existed to within a few yards of the falls, for anything that can be seen to the contrary."

1877

1877 Barlow

BARLOW, W. H. The upward jets of Niagara. (Jour. Frank. inst., Oct., 1877. 104:275–277.)

When visiting Niagara last year, . . . I observed certain physical effects connected with the Great Falls, to which I desire to draw attention.

1. It was observable that the doors and windows of our hotel, unless tightly closed, were subjected to a jarring movement, the impulses of which varied in time and degree.

The hotel in question is Clifton House, on the Canada side; its southern face being parallel to and nearly opposite the American Falls, from which it is distant about a quarter of a mile, and its south-west corner is not far from being opposite to the mean line of face of the Canada or Horse-shoe Fall, the distance being somewhat over half a mile.

The windows of the hotel opened on hinges, and if one of them was set slightly opened, and the observer placed himself in such a position as to see the reflections of distant objects on the surface of the glass, the times and varying intensity of the jarring impulses could be clearly seen.

2. On looking at the Falls themselves, and especially at the Horse-Shoe Fall, there appeared from time to time, through the mist which always envelops the lower part of the Falls, jets of water projected suddenly upwards.

These jets frequently rose much above the level of the upper part of the fall. Judging from the known height of the Falls they frequently rose from 10 ft. to 30 ft. above the upper level. They occurred at varying intervals; but very few minutes elapsed without seeing one of greater or less magnitude. It was also observable that they had a characteristic form, somewhat resembling a pine-tree, that is to say, small or pointed at the top, and widening out downwards. They were not formed of a compact mass of water, but had that appearance, which is seen in large fountains, of being composed of lumps of water of

THE HORSE SHOE FALL, NIAGARA — WITH THE TOWER

Painted by W. H. Bartlett; engraved by P. Brandard. Published in London by George Virtue, 1837

various sizes, decreasing in the lower part, until they were lost in the general mist which surrounded the lower part of the Falls. 1877 Barlow

The continual recurrence of these jets, and the continual recurrence of the jarring action above referred to, point to the conclusion that both effects are due to one cause, and my object in drawing attention to the subject is to endeavor to suggest the nature of the cause which is producing these effects.

Proceeding to a nearer view of the waters by going beneath the Falls, and looking at and through them, it becomes apparent that the water which flows over the upper rocks in a continuous curved stream, breaks up into masses of greater or less magnitude during its descent, so that air in large quantities gets in and between the falling masses of water. In this intermixing of air and water it may frequently happen that a quantity of air is surrounded and enclosed in a heavy mass of water, and falling in this state with a velocity due to the height of 150 ft. or 160 ft., the contained air would become suddenly and violently compressed on striking the rocks below. The energy of the charge of compressed air thus suddenly generated, would burst through the thinnest layer of its surrounding water, and so constitute a species of explosion, carrying a portion of the water with it. Assuming the weight of water which generated the compression to be greater than that on which the energy of the compressed air operated, the effect would be to project the smaller mass of water with a greater velocity than that due to the original fall. The supposition most consistent with the observed phenomena appears, therefore, to be that the two effects, namely, the jets of water and the jarring action shown on the doors and windows, are both due to the explosions or sudden expansions of air compressed by the falling water as above described. There are several circumstances which appear to favor this supposition.

1. The sudden upward blasts of air accompanied by water, felt by persons when beneath the Falls, which are probably only minor effects of a like action.

2. The jarring motion imparted to the doors and windows

1877 Barlow

appears to have no corresponding effect in the solid ground; from which it may be inferred that the effect is due to concussions conveyed through the air, and not to the tremor of the earth by the weight of the falling water.

3. The characteristic form of the jets, which is similar to that produced by explosions under water, when the conditions are such as to throw the water to a considerable height.

And lastly. The suddenness and energy of the operating force as shown by the jets being frequently projected considerably above the level of the upper water.

1880

1880 Wardwell

WARDWELL, G. T. Gorge of the Niagara: read before the Buffalo field club. Dec. 3, 1880. n. imp.

A typewritten paper to be found in the Buffalo Public Library. It is a very simple account, based on Lyell and Hall, of the origin of the gorge, the recession of the Falls, and their future.

1881

1881 Ballou

BALLOU, WILLIAM HOSEA. Niagara river. (Sci. Am. sup., Jan. 21, 1882. 13:5045–5046.)

This paper was read before the American Association for the Advancement of Science at the Cincinnati meeting in 1881.

Many attempts were made previous to the government survey [in 1876] to obtain the depths of the water in the cañon below the Falls. Bars of railway iron, pails of stones, and all unreasonable and awkward instruments were attached to long lines and lowered from the railway suspension bridge, but positively refused to sink. The reason for this is obvious. The very bulk of the instruments was sufficient, no matter what their weight, to give the powerful undercurrent the means to buoy them upon or near the surface. Our party, however, with a small sounding lead of twelve pounds weight, attached to a slender cord, easily obtained the depths from the Falls to the railway suspension

bridge. One day we launched a small boat at the inclined railway, and entered on a most exciting and perilous exploration of this part of the cañon. The old guide long in charge of the miniature ferry situated here accompanied the party. With great difficulty we approached within a short distance of the American Falls, which darted great jets of water upon us and far out into the stream. The roar was so terrible that no voice or human sound, however near we were to one another, could be heard. The leadsman cast the line, which passed rapidly down and told off eighty-three feet. This was quite near the shore. Passing out of the friendly eddy which had assisted us so near the Falls we shot rapidly down the stream. The next cast of the lead read one hundred feet, deepening to one hundred and ninety-three feet at the inclined railway. The average depth to the Swift Drift, where the river suddenly becomes narrow, with a velocity too great to be measured, was one hundred and fifty-three feet. Just under the railway bridge the whirlpool rapids set in, and so violently are the waters agitated that they rise like ocean billows to the height of twenty feet. At this point I computed the depth at two hundred and ten feet, which was accepted as approximately correct. 1881 Ballou

1882

MADAN, H. G. Complementary colors at the Falls of Niagara. (Nature. Dec. 21, 1882. 27:174.) 1882 Madan

A letter to the editor of *Nature* regarding contrast-colors at the Falls.

1883

POHLMAN, JULIUS. Life history of the Niagara river. Proc. A. A. A. S. (Aug. 1883. 32:302.) [Abstract.] 1883 Pohlman

The author concludes that the "time necessary to excavate the gorge of the Niagara below the falls has always been over estimated, for that portion which would take the longest time — between whirlpool and fall, was already excavated in pre-glacial times and the three miles between whirlpool and Lewiston were composed almost entirely of shales."

1884

1884 Hallett

HALLETT, P———. Notes on Niagara. (Brit. Assn. for the A. S. Rep't of 54th meeting. 1885. Pp. 744–745.)

This paper was read at the Montreal meeting in August and September of 1884. The author feels that "material argument in favour of utilisation, great as it is" is not conclusively "in favour of the utiliser." The preservation of the Falls plays an important part in the circulation of the entire Great Lake region.

1884

[Review of George Frederick Wright's article on "The Niagara gorge as a chronometer."] (Sci., May 2, 1884. 3:556.)

1884 Wright

WRIGHT, GEORGE FREDERICK. The Niagara gorge as a chronometer. (Bibliotheca Sacra, Apr., 1884. 41:369–376.)

The author holds that the preglacial drainage of the lake region was not through the present channel of the Niagara River and that in the present Niagara River the portion of the gorge below the whirlpool is postglacial. He then reviews various estimates of recession and concludes as follows: "From the best light we now have, it seems altogether probable that the cataract is receding at a rate that would suffice to produce the whole chasm from Queenston up in less than twelve thousand years; and if, as is not unlikely, any considerable portion of the gorge above the whirlpool had been formed by preglacial agencies, even that relatively short period must be considerably abbreviated."

WRIGHT, GEORGE FREDERICK. The Niagara river and the glacial period. (Am. jour. sci., July, 1884. 128 (ser. 3, 28):32–35.)

It seems to me probable that the Niagara River has itself worn the whole of the gorge from Queenston to the falls, with, perhaps, a very little help from preglacial erosion above the whirlpool; though this is a point difficult of absolute determination.

1885

1885 Garbett

GARBETT, E. L. The recession of Niagara Falls in one hundred thirty-three years. (Nature, July 16, 1885. 32:244–245.)

Comments on Kalm and Wesson.

1885 Wesson

WESSON, EDWARD. Niagara Falls: the rate at which they recede southwards. (Nature, July 9, 1885. 32:229–230.)

WRIGHT, GEORGE FREDERICK. Niagara gorge as a chronometer. (Sci., May 15, 1885. 5:399–401.) 1885 Wright

1886

CLAYPOLE, E. W. The old gorge at Niagara. (Science n. s., Aug. 13, 1886. 8:236.) 1886 Claypole

Gives an account of the discovery of the limestone ledge at the bottom of the old Niagara gorge, 100 feet above the present river level, which the author contends proves that if the course of the river went this way its bed was far above the present level.

GILBERT, GROVE KARL. The place of Niagara Falls in geologic history. [Abstract.] (Proc. A. A. A. S. Aug., 1886. 35:222–223.) 1886 Gilbert

Treats of the rate of recession of Niagara Falls.

HOVEY, H. C. Niagara river gorge and falls. (Sci. Am. sup., Sept. 11, 1886. 22:8917.) 1886 Hovey

A review of papers read at the Buffalo meeting of the American Association for the Advancement of Science, August, 1886, which gave special attention to Niagara. The resume of Pohlman's paper is deemed worth quoting.

If there were ever any falls at Lewiston, which is now doubted by many, they could not have been very great till after the subsidence of Lake Ontario. . . . He [Professor Comstock, of Cornell University] also held that there was never any fall at Lewiston, the rocks being too thin and friable to afford enough resistance to allow the formation of anything more than the rapids of a swift river.

The origin of the Niagara River, according to the able and ingenious paper read by Dr. Pohlman, of Buffalo, carries us back to pre-glacial times. . . .

Let me briefly recapitulate in Dr. Pohlman's words: "In the pre-glacial time, a stream filled the valley of the Tonawanda, whose surplus waters formed an outlet along the gorge of the present Niagara River, from the falls to the whirlpool, and thence by way of the now drift-filled valley of the St. Davis into the Ontario. After this valley had been closed during the

1886 Hovey

ice period, Lakes Erie and Ontario subsided together until separated by the Lewiston escarpment; then the drainage of the first found its way through the drift deposits along the ancient river valleys between Buffalo and Lewiston. Owing to the slow subsidence of Lake Ontario, there never was a fall of any kind at Lewiston, but the river excavated its gorge thence to the whirlpool along an old shallow valley, as a rapid. Here it met the pre-glacial Tonawanda, along which the fall of the Niagara receded to its present site."

I have thus tried to do ample justice to Dr. Pohlman's views on account of their originality, the very great interest they awakened in the geological section, and, let me add, because they seem to be sustained by the facts in the case. . . . It should be stated, however, that some of the more conservative geologists, among whom may be named Prof. James Hall, adhere to the older theories.

1886 Pohlman

POHLMAN, JULIUS. The Niagara gorge. (Pre-glacial erosion along the course of the Niagara.) (Proc. A. A. A. S. Aug., 1886. 35:221–222.) [Abstract.]

In this paper the author advanced the opinion that a small ancient water-basin existed between the parallel east-west outcrops of the Niagara and the corniferous limestone in the neighborhood of the falls owing to the excavation of the softer shales of the intermediate Onondaga group. . . . The drainage of this lake was, he considered, into the valley of Ontario. . . . The popular opinion that the Niagara river has cut its own gorge all the way from Lewiston to the Falls is, in the author's opinion erroneous, for when the recession reached the whirlpool it found the old gorge of the Tonawanda and quickly cleaned it out.

1886 Winchell

WINCHELL, ALEXANDER. Walks and talks in the geological field. N. Y.: Chaut. Press. 1886. P. 43.

The high flood of the lakes must have been 182 feet higher than the escarpment or wall of rock back of Lewiston, through which the Niagara river has cut its gorge. Undoubtedly, this

escarpment, which runs east nearly parallel with the shore of Lake Ontario, was formerly much higher than at present; but we have no evidence that it stood 190 feet higher than in our time. The Lewiston escarpment is at present 38 feet above Lake Erie, and could have dammed the lake to that height, at any time before the Niagara gorge was begun. [In chapter on The Floods of the Great Lakes.] 1886 Winchell

WOODWARD, ROBERT SIMPSON. List of co-ordinates used and determined in a survey of Niagara Falls, made in . . . 1886 for the United States geological survey. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany, 1891, 7:103–116.) 1886 Woodward

WOODWARD, ROBERT SIMPSON. On the rate of recession of Niagara Falls as shown by the results of a recent survey. [Abstract.] (Proc. A. A. A. S. Aug., 1886. 35:222–223.)

The paper consisted of the presentation of the results of a survey of the Falls just completed, and a comparison of its results with the surveys of 1842 and 1875 with accompanying remarks.

WOODWARD, ROBERT SIMPSON. On the rate of recession of Niagara Falls. (Am. jour. of sci. 1886. 28:383–384.)

WOODWARD, ROBERT SIMPSON. On the rate of recession of Niagara Falls. (Science, Sept. 3, 1886. 8:205.)

1887

CLAYPOLE, E. W. The eccentricity theory of glacial cold versus the facts. (Trans. Edin. Geol. Soc., 1888. 5:534–548.) 1887 Claypole

This paper read at the fifty-fourth session of the society, in November, 1887, reviews the evidence pointing to the Niagara gorge as a measure of postglacial time. The author states that "the conclusion is inevitable that at their commencement at Queenstown the crest of the falls was nearly 40 feet above the present level of Lake Erie, and that the total descent between the two lakes was 370 feet instead of the existing 330 feet, the whole of which was for a time concentrated in one cataract of that height — increased probably by differential elevation — at the edge of the Silurian escarpment."

SPENCER, JOSEPH WILLIAM WINTHROP. Age of the Niagara river. (Am nat., March, 1887. 21:269–270.) 1887 Spencer

1887 Spencer

An abstract of a paper read before the American Association for the Advancement of Science in August, 1886, at Buffalo. The author reviews the observations and conclusions of himself, Dr. Pohlman, and Professor Claypole to prove that the "St. David's Valley and such portions of the channel as those ice-matched above the whirlpool which remain, represent only the water course or water courses of local drainage before the ice-age. This being the case, the ancient river did not recede deeply into the Niagara escarpment, and we are led to the conclusion that the canon of the Niagara river, above the whirlpool as below, is mostly of modern origin throughout, and not to any great extent, an ancient drift-filled gorge, re-excavated since the ice-age."

1888

1888 Pohlman

POHLMAN, JULIUS. The life history of Niagara. (Trans. of the Am. Inst. Mining Engrs., Buffalo meeting, 1888. 17:322–338.)

A history of the Niagara river, preglacial and glacial, and of the recession of the Falls. The author thinks that "the falls as we see them today, or in anything resembling their present form, can never have been at Lewiston." He goes on to say: "It seems probable that the gorge was eroded as rapidly as the waters of Lake Ontario subsided, and that in its whole length of three miles there never existed at one time more than one small fall, while the rest presented the appearance of the river as we see it today — a long series of rapids." Mr. Pohlman holds that the Niagara river, from Buffalo to the whirlpool, is of preglacial origin. He thinks that "beginning the existence of the cataract about a mile and a half northerly from the present site, the age to be assigned to the cataract dwindles down to the quite respectable, but geologically speaking small, number of perhaps three thousand years."

1888

The retrocession of Niagara Falls. (Eng. news, Dec. 15, 1888. 20:462.)

Extract from paper by Professor Julius Pohlman.

1889

1889 Claypole

CLAYPOLE, E. W. Falls of rock at Niagara. (Nature, Feb. 14. 1889. 39:367.)

Account of two falls of rock at Niagara during January, 1889, which the author believes proves that recession is going on much more rapidly than estimated by Sir Charles Lyell in 1842.

GILBERT, GROVE KARL. The history of the Niagara river. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: 1890. 6:61–84.) 1889 Gilbert

The substance of a lecture read to the American Association for the Advancement of Science at its Toronto meeting, August, 1889, and deals with the origin of the river and its mode of recession, together with a list of the factors entering into and some of the questions to be answered before any solution of the time problem can be regarded as satisfactory.

The difference between the two processes is of great importance in the present connection, because the two rates of erosion are very different.

I am fully aware that this sketch of the cataract's work is not a satisfactory explanation of the mode of recession, but it yet serves a present purpose, for it renders it possible to point out that the rate of recession is affected by certain factors which may have varied during the earlier history of the river. We see that the process of recession is concerned with a heavy bed of hard rock above, with beds of softer rock beneath, with the force of falling water, and possibly, also, with the solvent power of the water.

Concerning each of these factors a number of pertinent questions may be asked, questions that should certainly be considered, whether they are answered or not, before any solution of the time problem is regarded as satisfactory. To illustrate their pertinence, a few will be propounded.

Question 1. Does the limestone vary in constitution in different parts of the gorge? If its texture or its system of cracks and joints varies, the process of recession may vary in consequence.

Question 2. How does the limestone bed vary in thickness in different parts of the gorge? This question is easily answered, for at all points it is well exposed for measurement.

Question 3. How is the thickness of the limestone related to the rate of recession? This is more difficult. The débris from a very thick bed of limestone would oppose great resistance to the cataract and check its work. The débris from a very thin bed would afford small and inefficient pestles for pot-hole action,

1889
Gilbert

learn the relations of those variations to each other, and so we ask:

Question 15. How have the variations of rock section, the variations of cataract height, the variations of form of channel and the variations of volume been related to one another in point of time? What have been their actual combinations?

Question 16. How have the various temporary combinations of factors affected the process of retreat and the rate of recession?

The tale of questions is not exhausted, but no more are needed if only it has been shown that the subject is not in reality simple, as many have assumed, but highly complex. Some of the questions are, indeed, easily answered. It may be possible to show that others are of small moment. It may even be that careful study of the local features will enable the investigator to infer the process of cataract work at each point from the existing condition of the gorge, and thus relieve him from the necessity of considering such remote questions as the nature of glacial climate and the history of glacial retreat. But after all paring and pruning what remains of the problem will be no bagatelle. It is not to be solved by a few figures on a slate, nor yet by the writing of many essays. It is not to be solved by the cunning discussion of our scant, yet too puzzling knowledge — smoothing away inconvenient doubts with convenient assumptions, and cancelling out, as though compensatory, terms of unknown value that happen to stand on opposite sides of the equation. It is a problem of nature, and like other natural problems demands the patient gathering of facts, of facts of many kinds, of categories of facts suggested by the tentative theories of to-day, and of new categories of facts to be suggested by new theories.

I have said our problem is but the stepping stone to another problem, the discovery of common units for earth history and human history. The Niagara bridges the chasm in another way, or more strictly, in another sense, for the term of its life belongs

to both histories. The river sprang from a great geologic revo- 1889
lution, the banishment of the dynasty of cold, and so its lifetime Gilbert
is a geologic epoch; but from first to last man has been the witness of its toil, and so its history is interwoven with the history of man. The human comrade of the river's youth was not, alas, a reporter with a note-book, else our present labor would be light. He has even told us little of himself. We only know that on a gravelly beach of Lake Iroquois, now the Ridge road, he rudely gathered stones to make a hearth, and built a fire; and the next storm breakers, forcing back the beach, buried and thus preserved, to gratify yet whet our curiosity, hearth, ashes and charred sticks.

In these Darwinian days, we can not deem primeval the man possessed of the Promethean art of fire, and so his presence on the scene adds zest to the pursuit of the Niagara problem. Whatever the antiquity of the great cataract may be found to be, the antiquity of man is greater.

GILBERT, GROVE KARL. The history of the Niagara river. (Ann. rep'ts of the Smith. inst. 1890. Gen. app. Pp. 231–257.)

Taken from the sixth annual report of the Commissioners of the State Reservation at Niagara.

Recent changes at Niagara Falls. (Sci. Am., April 6, 1889. 1889
60:216.)

Account of heavy fall of rock.

Recession of the Falls. (Ann. rep'ts of the com'rs of the state reserv. 1889
at Niagara. Albany: 1889. 5:56–64.)

Contains extracts from Tyndall and Lyell together with an account of other great cataracts of the world.

SHALER, NATHANIEL SOUTHGATE. Aspects of the earth. N. Y.: 1889
Scribner. 1889. Pp. 161–163. Shaler

The Niagara cataract is used as an illustration of falls due to inclined strata, as "perhaps the noblest of all such geological accidents" the author tells us.

1889
Gilbert

and might lead to a slow rate of recession. If the thickness now seen at the cataract were slightly increased or slightly diminished, it is not at once apparent how the rate of recession would be affected, and yet there might be an important difference.

We have seen that the pre-glacial stream whose channel is betrayed at the Whirlpool, removed the Niagara limestone through a portion of the gorge, and

Question 4 asks: Through what portion of the gorge was the Niagara limestone absent when the Niagara river began its work?

Question 5. Does the rock section beneath the limestone — the shale series with its imbedded harder layers — does this vary in different parts of the gorge?

Question 6. Through what distance were the several members of the underlying rock series removed by the action of the pre-glacial stream?

Coming now to consider the force of the falling water, a little consideration serves to show that the force depends on at least three things: The height through which the water falls, the degree of concentration of the stream, and the volume of the river.

The height of the fall is the vertical distance from its crest to the surface of the pool below.

Question 7 asks: How has the height of the crest of the fall varied during the history of recession?

Question 8. How has the height of the base of the fall varied? And this involves a subsidiary question,— to what extent has the excavated gorge, as left by the retreating cataract, been refilled, either by the falling in of fragments from the cliffs, or by contributions of débris brought by the current?

Question 9. What has been the form of the channel at the crest of the fall, from point to point, during the recession? Wherever the channel has been broad, and the water of uniform depth from side to side, the force of the falling water has been applied disadvantageously; wherever the channel has been

narrow, or has been much deeper in some parts than in others, the force of the water has been applied advantageously. 1889 Gilbert

There are many ways in which it is possible that the volume of the river was made to differ at early dates from its present volume. During the presence of the ice, there was a different climate, and there were different drainage systems.

Question 10. During the early history of the river, was the annual rainfall on which its water supply depended greater or less than now?

Question 11. Was the evaporation from the basin at that time greater or less than now? It is believed that at the present time the Niagara river receives less than half the water that falls upon its basin in rain and snow, the remainder being returned to the air by evaporation from the lakes, from the surface of the land and from vegetation.

Question 12. Was the water supply increased by ablation? There may have been times when the overlapping edge of the glacier discharged to the Laurentian basin large bodies of water furnished by the melting of ice that had congealed from the clouds of regions far away.

Question 13. Was the drainage area of the river at any time increased through the agency of ice barriers? Just as the Winnipeg basin was made to send its water to the Mississippi, so we can imagine that regions north of the Great Lakes and now tributary to Hudson's bay, had their discharge temporarily turned to Lake Superior and Lake Huron.

On the other hand, we have seen that the discharge of the whole district of the upper lakes was for a time turned away from the Niagara river. Therefore, we ask:

Question 14. To what extent and for what periods was the volume of the river diminished through the diversion of the discharge of the upper lakes?

Assuming all these questions to be answered one by one, and the variations of different sorts determined, it is still necessary to

1890

1890 Bogart

BOGART, JOHN. Report on the outline of the crest of the falls of Niagara in 1890, and the recession of the falls since 1842. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: 1891. 7:89–94.)

This report was made by the State Engineer and Surveyor.

1890 Hall

HALL, W. CARVEL. Report of survey of the crest line of Niagara Falls. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. 1906. 23:67–73.)

This survey was made in 1890 and gives a new theory as to the apparent advance of the crest line at some points.

The determination of the present crest line of the Falls was decided in order that, by comparison with maps of earlier dates, the changes could be determined and the rate of recession computed.

1890 Kibbe

KIBBE, AUGUST S. Report of the survey to determine the crest lines of the falls of Niagara in 1890, made under the direction of John Bogart, state engineer and surveyor. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: 1891. 7:95–102.)

Makes comparison with previous surveys and explanations of discrepancy.

1890 Leverett

LEVERETT, FRANK. Glacial formations and drainage features of the Erie and Ohio basins. (U. S. geol. surv. Wash.: Gov't. print. off. 1902. Pp. 70–71.)

This monograph contains a description of the Niagara escarpment.

1890

New York (state). Surveys of the crest of Niagara Falls. (Ann. rep'ts of the state engineer and surveyor (1890). Albany: J. B. Lyon. 1891. Pp. 29–31.)

This survey was made under the direction of the State Engineer, by Mr. August S. Kibbe, assistant engineer in charge. Comparisons are given with former surveys, and there is a table showing the rate of recession.

1890

Report of the survey to determine the crest lines of the falls of Niagara in 1890, errata and additional monuments. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: 1892. 8:64.)

SCOVELL, J. T. An old channel of the Niagara river. (Proc. A.A.A.S. Aug., 1890. 39:245–246.) [Abstract.] 1890 Scovell

A recapitulation of the evidence which indicates the old channel.

1891

BOURNE, EDWARD G. The recession of Niagara gorge. (Nature, Apr. 2, 1891. 43:515.) 1891 Bourne

A study of the sources of information on the subject.

1893

WRIGHT, GEORGE FREDERICK. Extract from Man and the glacial period. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: 1893. Pp. 84–87.) 1893 Wright

Account of the birth of the Niagara river and the recession of the Falls.

1894

Age of Niagara. A review of Spencer's "Duration of Niagara Falls.") (Geog. jour. (Lond.), Feb., 1895. 5:172–173.) 1894

This review summarizes Professor Spencer's views as expressed in his paper on the "Duration of Niagara Falls," which was afterward published as chapter IX in his book "The Duration of Niagara Falls and the History of the Great Lakes."

BUCK, L. L. A few remarks about the Niagara gorge, and discussion. (Trans. A.M.S.C.E. Aug., 1894. 32:205–213.) 1894 Buck

It is stated in the paper that it was presented at that time "to call the attention of the members, while on the spot, to the pecularities of the gorge and to point out the portions where, at various times in the past, the conditions must have been different from what they are at present."

GILBERT, GROVE KARL. Niagara river as a geologic chronometer. (Nature, May 17, 1894. 50:53.) 1894 Gilbert

A brief and humorous letter in which the author explains his position on the question of the age of Niagara Falls.

KINGSMILL, THOMAS W. Time gauge of Niagara. (Nature, Aug. 9, 1894. 50:338.) 1894 Kingsmill

Advances the theory of the discharge of Lake Ontario into Lake Erie in postglacial time.

1894
Spencer

SPENCER, JOSEPH WILLIAM WINTHROP. Age of Niagara Falls. (Am. geol., August, 1894. 14:135–136.)

The first five lines of this article state that it is " written simply as a protest against anyone forming a conclusion as to my work on the history of the Great Lakes, or forming judgments of the history of the lakes themselves, upon the strength of Mr. Upham's citations (Am. geol., July. 1894) from my writings."

SPENCER, JOSEPH WILLIAM WINTHROP. Niagara Falls as a chronometer of geological time. (Proc. Royal Soc. of London. March 6, 1894. 56:145–148.) [Abstract.]

1. Conjectures as to the age of Niagara Falls.
2. Modern topography.
3. Geology of the district.
4. Ancient topography.
5. Basement of the river.
6. Discharge of the Niagara river.
7. Modern recession of the Falls.
8. Sketch of the lake history and the nativity of Niagara river.
9. Laws of erosion.

10 & 11. Episodes of the river and the amount of recession in each.

12. Relations between the terrestrial or epeirogenic movements and the Falls.

13. The relation of Niagara Falls to geological time.

14. The end of the Falls.

7000–8000 years hence.

SPENCER, JOSEPH WILLIAM WINTHROP. Review of the history of the great lakes. (Am. geol., Nov., 1894. 14:289–301.)

On page 298 of this article is a " History of the Niagara River and Changes of the Outlets of the Lakes."

CHAPTER VII — PART II

Chapter VII — Part II

1894

Spencer, Joseph William Winthrop. Duration of Niagara Falls. (Am. jour. sci., Dec., 1894. 148 (ser. 3, 48): 455–472.) 1894 Spencer

A paper read before the American Association for the Advancement of Science, August 20, 1894. The topics discussed are as follows: Conjectures as to the age of Niagara Falls; the modern topography of the region; the geology of the district; the ancient topography and the basement of the river; the discharge of the Niagara river; the modern recession of the Falls; a sketch of lake history and the nativity of the Niagara river; episodes of the river; the age of the Falls; the confirmation of the age of the Falls by the phenomena of terrestrial movements; the relationship of the Falls to geological time; the end of the Falls; conclusions. The paper is reprinted as chapter IX of Dr. Spencer's book, " The Duration of Niagara Falls and the History of the Great Lakes."

Spencer, Joseph William Winthrop. The duration of Niagara Falls. (Am. nat., Oct., 1894. 28:859–862.)

A physical study setting forth the changing episode in the history of the Falls, computing the age of the river, and giving suggestions as to the antiquity of man.

Upham, Warren. The Niagara gorge as a measure of the post-glacial period. (Am. geol., July, 1894. 14:62–65.) 1894 Upham

Upham, Warren. Niagara river since the ice age. (Nature, June 28, 1894. 50:198–199.)

A discussion of the origin of the old lake beaches and the duration of the postglacial period, with reference to recent contributions on these subjects by various authors.

1895

Gilbert, Grove Karl. Niagara Falls and their history. (Nat. geographic monographs. Sept., 1895. Vol. 1, no. 7.)

Among the multitude there are some whose appreciation of its power has a utilitarian phase, so that they think most of the myriad wheels of industry its energy may some day turn; and 1895 Gilbert

1895 Gilbert

there are a few who recognize it as a great natural engine, and in its activity and its surroundings see an impressive object lesson of geographic progress. Its aesthetic and utilitarian aspects need no expounder, but its geographic significance is too little appreciated. This paper endeavors to tell in simple language some of the lore of the professional geographer and geologist, in order that the layman may gain pleasure not only from the beauty and grandeur of the scene, but through understanding its meaning as a part in the great drama of nature.

. . . . .

This monograph may be regarded as an explanatory account of Niagara Falls and the associated natural features.

The same article appears in the 10th Annual Report of the Queen Victoria Niagara Falls Park Commissioners (1895).

1895 Spencer

SPENCER, JOSEPH WILLIAM WINTHROP. The duration of Niagara Falls and the history of the great lakes. . . . 2d ed. N. Y.: Humboldt. (1895.) Pp. 99–117.

"An excellent series of papers explaining the geological features and history of Niagara Falls and environs."—Am. jour. sci., 151:398.

This volume consists of a series of articles previously printed in various scientific journals. It forms part of the 11th Annual Report of the Commissioners of the State Reservation at Niagara for the year 1893–94.

Chapter IX treats of the history and duration of Niagara Falls, taking up various conjectures as to the age of the Falls, the geology of the district, ancient topography and basement, discharge of the Niagara river, modern recession of the Falls, episodes of the river and the duration of each, the age of the Falls and their relation to geological time, with speculations as to the end of the Falls. A contribution of special interest is the discussion of the work accomplished by the river during each of the episodes of its history.

Ancient Topography and Basement

In the numerous writings upon the Niagara river one ancient topographic feature has been overlooked and another exaggerated into importance which it does not possess. The ancient drainage of the Erie basin was not by way of the Niagara, but

by a channel 40 miles to the west. Even at the end of the Lake Erie the borings show old channels deeper than the floor of the river across the Devonian escarpments. The feature overlooked is the Tonawanda valley, a mile and a half in width, extending from the rapids above the falls to the Johnson ridge. Its basement is 80 or 90 feet below the northern barrier of Johnson's ridge. The rocky sub-surface of Goat Island was part of the ancient floor (see fig. 27). This depression is part of the ancient Tonawanda basin, which is now filled with drift (see fig. 24). The gorge through Johnson's ridge is modern with vertical walls, but half a mile to the west it falls away and the wells reveal the continuation of the Tonawanda depression extending northward. It is again made known by a well half a mile west of the whirlpool (*w*, fig. 19), in the line of the extension of the St. David's valley. This forms an embayment one and half miles wide and only three-quarters of a mile deep in the face of the Niagara escarpment. The modern river is simply crossing a portion of the old Tonawanda basin in the vicinity of the falls, and consequently it has here much less rock to excavate than through and north of Johnson's ridge. 1895 Spencer

The other feature is the imaginary whirlpool — St. David's valley, supposed to have been the old course of the river. Above and below the whirlpool alike, the gorge is of recent date as may be seen by the vertical walls shown in the several sections. The whirlpool ravine has sloping V-shaped boundaries in its higher portion, which is an antique structure. The depression is so obstructed with drift, that gives rise to landslides that the old topography is much obscured. Yet a little stream has removed the fallen earth and exposed a natural section of Clinton limestones, which cross the valley at an elevation of 115 feet above the surface of the whirlpool, or 160 feet above Lake Ontario, with Niagara shales showing for at least 20 feet higher. Thus the rocky barrier across the ravine is not less than 240 feet above the bottom of the cañon in the whirlpool. This barrier in the ravine is illustrated in fig. 19, which should be compared with

1895
Spencer

figures 22 and 23, in order to appreciate the insignificance of the whirlpool ravine.

The form of the whirlpool cauldron requires explanation. At Mr. Shepherd's house, a short distance west of the whirlpool, there is a well 90 feet deep without reaching rock (*w*, fig. 19) and this shows the absence of Niagara limestones to a depth of more than 50 feet below the surface rocks of the western wall of the whirlpool. At that point the limestones rise 40 feet higher on the eastern side of the river than on the western, but the depression was leveled up with drift. Thus it appears that at this point the Niagara river took possession of the eastern side of a drift-filled valley (Tonawanda-St. David's), and the whirlpool ravine was a little tributary to it. When the falls had receded to the whirlpool and penetrated the rocky barrier, the currents were able to remove the filling of the buried ravine, and this gave rise to the form of the cauldron, which deepened its basin to lower levels by the currents of the river acting upon the underlying soft shales, with the landslides obscuring the older features. It is evident that there was no preglacial Niagara river.

The Niagara river crossed the broad shallow depression of the Tonawanda drainage, at the falls and that adjacent to the whirlpool on a basement of drift, but elsewhere generally on hard limestones. Out of both of these materials, terraces were carved thus marking the old river level, before it sunk within the chasm.

Sketch of the Lake History and the Nativity of the Falls

. . . At the commencement of the Lacustrine epoch, Warren water gulf covered most of the Lake region, and Forest beach was its last strand. Afterwards the waters sank 150 feet, thereby dismembering Warren water gulf into Algonquin Gulf

(confining it to the basins of Superior, Michigan and Huron) with an outlet by way of the Ottawa valley, and Lundy gulf (occupying the Erie basin and) extending into the Ontario valley. These two bodies of water appear to have had a common level as if connected in some way across the Ontario basin, but their northeastern extensions are not known and involve unsettled questions that do not affect the history of Niagara. Again, the waters were lowered so that the Niagara River emptied the overflow of the Erie basin, without a fall into the Ontario valley. This condition did not last long, for the waters sank to a level (Iroquois beach) of 300 feet below the Lundy (and also Algonquin) plain, and the falls commenced their descent with the waters of the Erie basin alone. The subsidence was accompanied by slight pauses, but waters remained for a long time at the level of the Iroquois beach, which is now about 135 feet above Lake Ontario at the end of the gorge. Again the waters subsided to the level about 80 feet beneath the present level of the head of Lake Ontario, and thereby lengthened the river to 12 miles beyond the end of the chasm. At this time the descent of the river after passing the rapids at Johnson's ridge was 420 feet. By the continued northeastern terrestrial elevation the waters of the Huron basin were turned from the Ottawa drainage into the Erie basin, whose northeastern rim was elevated so as to flood the lake. Later, the waters at the head of Lake Ontario were raised 80 feet to the present level. This differential movement was at zero at the head of Lake Erie; 2.5 feet per mile in the Niagara district; 4 feet northeast of Lake Huron, and 5 feet per mile at the outlet of Lake Ontario. 1895 Spencer

At the nativity of the Niagara River there was no fall. A little later in the Iroquois episode the falls were very much like the modern American cataract, both in height and volume, but afterwards it increased in magnitude and went through the changes noted later.

Laws of Erosion

1895
Spencer

When erosion is considered from a theoretical point of view and the whole energy of the water is supposed to be expressed in the erosion, it varies as the mass of the water into the square of the velocity (wv^2). Hence for a given river increase of the amount of its water or increase of the velocity along its course should be expressed by greater erosion. But erosion is not the only expression of the theoretical value of the energy of the river. Again, it is well known that the more rapid the descent of the stream the more the erosive effects are expended on the floor of the channel, in deepening and forming the U-shaped valleys or gorges. On the other hand, the reduction in the slope causes the channel to become broader — a principle which has an important bearing in this study. While the observations are imperfect, owing to the variable conditions of erosion, still the attempt to ascertain the duration of the different episodes is the only natural sequence to the measurements of the modern recession of the falls, and it gives approximate results, for without considering the changing episodes the rate of recession is of no geological interest. But this study may lead to further detailed investigations.

Episodes of the River and the Duration of Each — Age of the Falls

First Episode.— From the history of the lakes and the river we learn that the early falls cascaded from the brow of the escarpment to the level of the Iroquois beach 200 feet below, (with the Erie drainage only 3/11 of the total discharge of the upper lakes). There is no indication that the Erie rainfall was greater at that time than now. The length of the chasm excavated during the first episode is found in the data furnished by the study of Foster's flats. Their location is shown at F, figure 17, and the structures are further illustrated in figures 21 and 22.

The terrace (T) represents the former level of the river (about 190 feet above Lake Ontario). It is the only feature of the kind in the cañon. It is about 50-60 feet above the Iroquois level to which the river descended. Thus the slope of the earlier and smaller streams was about half as great again as the modern river over the rapids at this locality. The youthful river was broad and shallow, like and of about the same magnitude as the modern American channel and falls, acting evenly over the whole breadth and receding at about the same rate. The remnant of the platform shows how far the fall had receded before the physical change which threw the current to the eastern side of the channel. This change could be effected by increasing the height of the falls which would favor the deepening of the chasm at the expense of the width, especially as the lower rocks are mostly shale. This change of breadth from a wide and shallow to a narrow and deep channel is shown along the lower part of the cañon and is illustrated by the contracted channel at the bottom of the cañon in a section just above the end of the gorge (fig. 23). 1895 Spencer

As the changing conditions were gradual, I have placed the close of the first episode at the time when the falls had reached the foot of the terrace (B fig. 24), which is 11,000 feet from the end of the chasm. Varying the rate of recession for the different conditions of height and volume, acting under a general uniformity, the time needed to excavate the immature cañon as far as Foster's terrace is found to be 17,200 years.

Second Episode.— The subsiding of the waters at the end of the first episode, which concentrated the stream upon the side of the channel amounted to 220 feet, thus increasing the descent of the water to 420 feet, with the lake receding 12 miles, and adding this length of shaly rocks to be removed. The increased descent gave rise to new cascades over the hard Clinton limestones (*c* and *d*, fig. 24) and Medina sandstones (*h*, fig. 24) at the end of the cañon, after the shales between it and the lake had been somewhat reduced in height. A modern repetition of

1895
Spencer

three such cascades over the same series of rocks may be seen along the Genesee River near Rochester. Under this condition the upper cascade receded by itself past Foster's terrace, a distance of 3,000 feet. Thus closed the first stage of the second episode. After passing Foster's flats the chasm shows the effects of a greatly increased force, for the gorge is again widened with the terrace below washed away. As no change in the total height occurred about this time, the magnitude of the erosion indicates an increased discharge, which was produced by the turning of the waters of the Huron basin and adding them to the Niagara drainage. The effects of the greatly increased volume of the water were to widen the chasm and cut away part of Foster's platform, but leaving enough to tell the history. The upper falls were not joined by the more rapidly retreating lower cascades until after the whirlpool was passed, for the evidence of the upper water-level is left in the deposits of river gravels at an elevation of 190 feet on the northern side of the whirlpool ravine, which would not have been the case if the river were at a lower level after cascading over one united falls. Just above the whirlpool, the chasm becomes narrow, and here I close the second stage of this episode of three cascades. The length of this section of the gorge from (C to D fig. 24) is 7,000 feet. By considering the proportional amount of work accomplished during the elongation of the chasm, the deepening of the gorge left at the close of the first episode, and its extension 12 miles lakeward (the mean depth of shales removed from eight miles was 180 feet, and from four miles, 60 feet), and applying the laws of erosion, I have found that the first stage required 6,000 years and the second 4,000 years; or the duration of the second episode was 10,000 years.

Third Episode.— The narrowest portion of the gorge extends from the whirlpool for a distance of 4,000 feet as is shown in figure 25 and on the map in fig. 17. The various sections (figs. 22, 23, 25, 26, 27) should be compared.

This is at the site of the whirlpool rapids. My explanation of this narrow chasm, without any increased thickness of the limestone capping over the shaly bed is that the whole force of the falls descending 420 feet was concentrated in one cataract with a rapid of an additional height of 25 feet descending in front of Johnson's ridge. Thus the force engaged in undermining the limestones was exhausted in the recession of the falls by deepening the gorge in place of broadening it, a process more strongly brought out by contrast with the sections of the cañon, immediately above (fig. 26) and below (fig. 22) which are half as wide again. Such result is in accordance with the common observations that increased declivity causes the channels to be deepened, and decreased slope accelerates the widening of the channel as is shown in the section near the end of the gorge (fig. 23). The computation of the time of the retreat of the falls across this section is a simple problem as the fall of water amounted to 420 feet in place of 320 of the present day, and the volume was the same. Under these conditions the duration of this episode was 800 years. 1895 Spencer

Fourth Episode.— This is characterized by the rising of the waters in the Ontario basin so as to bring the lake to the present level, 320 feet below the rapids above the falls. The commencement of the work of this epoch was taken where the cañon suddenly became broad at the head of the whirlpool rapids, a phenomena explained by the force of the river being vertically diminished and latterly increased — the converse to the conditions of those of the third episode. At first the rocks in Johnson's ridge offered great resistance on account of the increased thickness of limestones nevertheless the lateral erosion gained the ascendancy over the vertical. The section through Johnson's ridge is 5,500 feet long, and with the laws of erosion the time necessary for the falls to retreat through it would be about 1,500 years — thus would end the first stage of the last episode. The last stage is the modern, or that since the cataract reached the

1895
Spencer

Tonawanda basin south of Johnson's ridge, whose rocky floor, generally speaking, is about 80-90 feet lower than that on the ridge (see fig. 24); yet the cañon just north of the ridge is only 250 feet wider than through that barrier. The drift filling the basin offered but little resistance to the recession of the falls and accordingly the rate of retreat has been comparatively rapid along this section of the river, which is 6,000 feet long. Consequently its age is about 1,500 years. Thus the duration of the fourth epoch has been 3,000 years.

Age of the Falls.—Allowing 1,000 years for the duration of the river before the advent of the falls,— for that its commencement was not characterized by a cascade is shown by the terraces on the edge of the escarpment and at the deserted mouth of the infant river,— and adding the duration of the four episodes, which have been calculated at 31,000 years, the age of Niagara River would be 32,000 years; and the date that the Huron drainage turned from the Ottawa valley to the Niagara was 7,800 years ago. In order to reduce the errors in reading the means of erosive effects, the component stages have been taken to as great a degree of accuracy as practicable. In the changes of level, the error would suggest itself to me as on the side of shortening the time; and there is no evidence that a much greater rate of recession than now has occurred other than that already made use of; also I have used the maximum discharge of Lake Erie. Consequently I am led to conclude that the present study has set forth the history and has compensated for possible overestimates in degrees of hardness, and fairly represented the age of the falls, which is very near that of Lyell's conjecture. There is considerable cumulative evidence adduced from the history of the lakes to strengthen confidence in the methods pursued in this investigation.

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Relationship of the Falls to Geological Time

All attempts to reduce geological time to terms of years are most difficult, but the Niagara river seemed to be an easy chronometer to read, and yet we see that some utterances even this year are vastly farther from the mark than those made fifty years ago — the clock had not kept mean time throughout its existence. After this attempt at regulating the chronometer, investigators will doubtless carry the determinations to greater accuracy, but for the present I can offer this geological compensation. The Niagara seems a stepping stone back to the ice age. What is the connection between the river and the Pleistocene phenomena? 1895 Spencer

The Lake epoch is an after phase of the Glacial period, and Niagara came into existence long subsequent to the commencement of the lakes. If we take the differential elevation of the deserted beaches, and treat them as absolute uplifts in the Niagara district, with the mean rate of rise in the earlier portion of the lake epoch as in the later, then the appearance of Warren water in the Erie basin was about 60 per cent longer ago than the age of Niagara river; or about 50,000 years ago. The earlier rate of deformation was not greater than that during the Niagara episode as shown by the deformation of the beaches, but it may have been slower, so that from 50,000 to 60,000 years ago Warren water covered more or less of the Erie basin. Before the birth of Niagara river, by several thousand years, there was open water extending from the Erie basin far into the Ontario and all the upper lakes were open water with a strait at Nipissing, but the northeastern limits are not known, and although they do not affect the age of Niagara, yet they leave an open question as to the end of the ice age, in case of those who do not regard the advent of the lakes as its termination. From these considerations it would appear that the close of the ice age may safely be placed at 50,000 years ago.

End of the Falls

1895
Spencer

As has already been noted, the falls were in danger of being ended by the turning of the waters into the Mississippi, when the cut through the Johnson ridge was effected. With the present rate of calculated terrestrial uplift in the Niagara district, and the rate of recession of the falls continued, or even doubled, before the cataract shall have reached the Devonian escarpment at Buffalo, that limestone barrier shall have been raised so high as to turn the waters of the upper lakes into the Mississippi drainage by way of Chicago. An elevation of 60 feet at the outlet of Lake Erie would bring the rocky floor of the channel as high as the Chicago divide, and an elevation of 70 feet would completely divert the drainage. This would require 5,000 or 6,000 years at the estimated rate of terrestrial elevation. It would be a repetition of the phenomena of the turning of the drainage of the upper lakes from the Ottawa valley into the Erie basin.

Conclusions

The computation of the age of the Niagara river,— based upon the measured rate of recession during 48 years; upon the changing descent of the river from 200 to 420 feet and back to 320 feet; and upon the variable discharge of water from that of the Erie basin only, during three-fourths of the life of the river, to afterwards that of all the upper lakes,— leads to the conclusion that the Niagara Falls are 31,000 years old and the river of 32,000 years duration; also that the Huron drainage turned from the Ottawa river into Lake Erie less than 8,000 years ago. Lastly, if the rate of terrestrial deformation continues as it appears to have done, then in about 5,000 years the life of Niagara Falls will cease, by the turning of the waters into the Mississippi. These computations are confirmed by the rate and amount of differential elevation recorded in the deserted beaches. It is further roughly estimated that the lake epoch commenced 50,000 or 60,000 years ago, and there was open water long

THE RAPIDS ABOVE THE FALLS OF NIAGARA

Painted by W. H. Bartlett; engraved by R. Brandard. Published in London by George Virtue, 1837

before the birth of Niagara in even the Ontario basin, and that under no circumstances could there have been any hydrostatic obstruction to the Ontario basin since before the birth of Niagara Falls. 1895 Spencer

SPENCER, JOSEPH WILLIAM WINTHROP. Duration of Niagara Falls and the history of the great lakes. 2d ed. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: 1895. 126pp.)

Geological survey of the Great Lakes, 1881–1894.

SPENCER, JOSEPH WILLIAM WINTHROP. The duration of Niagara Falls and the history of the great lakes. (*In* N. Y. (state) Assembly Docs. 118th sess. 1895. No. 90 app.)

TAYLOR, FRANK BURSLEY. Changes of level in the region of the great lakes in recent geological time. (Am. jour. sci., Jan., 1895. Ser. 3. 49:69–71.) 1895 Taylor

As a measure of the duration of postglacial time, therefore, I do not see how the gorge can have any value worth mentioning. But without meeting this demand, it goes far enough to show that postglacial time must have been much longer than the current estimate. . . . There is considerable evidence to show that the greater Niagara had another earlier period of postglacial activity, during which it cut out the gorge from Lewiston to Foster's flat. . . . Thus the great cataract has been intermittent in its activity. It has had two active periods, separated by the long, almost indefinitely long, period during which the falls of the smaller stream carried on the work.

TAYLOR, FRANK BURSLEY. Niagara and the Great Lakes. (Am. jour. sci., Apr., 1895. 149:249–270.)

The author takes a position between the theories of Spencer and Upham.

In the recent papers of Professor J. W. Spencer and Mr. Warren Upham, the post-glacial history of the Great Lakes has been ably told according to two very different ideas of the cause of Pleistocene change. Prof. Spencer on the one hand levels all the higher abandoned beaches with the sea, and does not distinctly

1895
Taylor

recognize a single ice-dammed lake. Mr. Upham, on the other hand, ascribes nearly all submergence to ice-dammed lakes, and admits none as marine except that which is proved by fossils. As often happens in such cases, the probability is that the truth lies between these wide extremes. Ice dams have played an important part, but not to the exclusion of marine submergence even at high levels. On the other hand, marine invasion is not available as an explanation for some of the most important areas of submergence.

The St. Lawrence river and the Great Lakes with their connecting channels are really all one stream. The lakes are great reservoirs which feed the rivers below them, and because they derive nearly all their supply from the lakes the rivers themselves have almost no independent existence. If anything happens to the lakes to turn their discharge in some other direction the rivers go nearly or entirely dry. Niagara is one of these rivers, and its history is inseparable from that of the lakes above it. Prof. Spencer has described the salient features of the Niagara gorge, and has also given many important facts bearing on the lake history. But certain facts which he does not take into account indicate a somewhat different lake history, and in consequence a different Niagara history also. The lake history is recorded in the larger characters, and it seems best therefore to study it first. Reference will be made in the following pages to six papers in which the writer's observations on the abandoned shore lines of the upper lakes are recorded. Another paper discussing the latest chapter in the history of the Great Lakes also belongs to this series. It is entitled, "The Second Lake Algonquin." It precedes this paper in order, and relates to the lake stages following next after those discussed here. These two papers together cover, in a preliminary way, the whole period from the final disappearance of the great Laurentide glacier down to the present time. But they do not include, except by incidental reference, the period of the glacial recession with its lakes.

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Chronological Conspectus

At its maximum the great Laurentide glacier covered the whole area of the Great Lakes. By a correlation of the abandoned shore lines, moraines and outlets, and the gorges, recently submerged shores and rivers of this region the following order of events is made out for the post-glacial history of the Great Lakes. They are set down in seven principal stages with transitions or critical stages between. 1895 Taylor

I. Glacial, ice-dammed lakes. Outlets at Fort Wayne, Chicago and other places. Beaches correlated with moraines in Ohio. Glacial lakes fall by stages as outlets change on withdrawal of the glacier-dams. Land relatively high in the north but slowly subsiding.

First Transition: By withdrawal of glacier the Niagara river is opened and the upper lakes become united.

II. First Niagara lakes. First epoch of Niagara Falls begins at Lewiston. For a short time glacial Lake Iroquois receives the water from Niagara. Shore lines of lower levels of this glacial lake washed over and obliterated by later marine invasion. Gradual depression of land continues at north, finally opening Nipissing outlet.

Second Transition: First two-outlet climax. Marked by the ALGONQUIN BEACH. (Possible subdivision here for supposed Trent river outlet.) Gradual northward depression continues. First epoch of Niagara Falls closes at the Whirlpool. Epoch of Erigan Fall begins.

III. First Lake Algonquin. Outlet eastward over Nipissing pass.

Third Transition: Gradual northward depression continues. Nipissing outlet brought down to sea level. Lakes become marine.

IV. Warren Gulf (rising stage). Marine waters fill the three upper lakes, the Ontario, St. Lawrence and Winnipeg basins.

1895 Taylor

Fourth Transition: Marine Climax. Marked by the CHIPPEWA BEACH. Northward depression ceases and gradual elevation begins. Iroquois and Herman marine beaches made at the same time as the Chippewa. This was probably the climax of the post-glacial warm epoch.

V. Warren Gulf (falling stage). Gradual northward elevation. Irregular uplifts in the north deforming Chippewa and Algonquin beaches.

Fifth Transition: Nipissing outlet raised to sea level. Upper lakes become fresh.

VI. Second Lake Algonquin. Outlet eastward over Nipissing pass. Probably a small amount of local uplift at outlet in early stage.

Sixth Transition: Second two-outlet climax. Marked by the NIPISSING BEACH. Epoch of Erigan Fall closes at a point between 40 and 80 rods above the cantilever bridge. Second (present) epoch of Niagara Falls begins.

VII. Second Niagara lakes (present stage). Lake Superior becomes independent. Great Champlain uplift at the northeast. Formation of St. Clair delta begins and continues to the present time.

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The age of Niagara. (Pub. opin., Oct. 29, 1896. 21:560.)

An excerpt from *Knowledge*, London.

1896 Brewer

BREWER, WILLIAM H. Earth tremors at Niagara Falls. (Yale sci. mo., May, 1896. 2:329–334.)

Observations of sound, earth tremors and vibrations at different distances from the Falls made on various visits of the author from 1851 to 1895. "The observations made on the various visits, sometimes very scanty and sometimes more extended, all agreed and indicate that the tremor is an extremely irregular jar, and not in any sense regular, rhythmic or pulsating waves."

The Great Lakes and Niagara. (Geog. jour. (Lond.), Feb., 1896. 7:204–205.) 1896

A review of Spencer's contributions in the 11th Report of the Commissioners of the New York State Reservation at Niagara.

HERBERTSON, ANDREW J. The history of the great lakes and Niagara. (Knowl., Oct. 1, 1896. 19:223–224.) 1896 Herbertson

A resume in popular style of Spencer's "The Duration of Niagara Falls and the History of the Great Lakes."

HERBERTSON, ANDREW J. The history of the Great Lakes and Niagara. (Sci. Am. sup., Nov. 7, 1896. 42:17398.)

Quoted from *Knowledge*.

SPENCER, JOSEPH WILLIAM WINTHROP. Niagara as a time-piece. (Pop. sci. mo., May, 1896. 49:1–19.) 1896 Spencer

The subjects considered are: The age of the Falls; the modern and ancient features of the district; the whirlpool and its ravine; the ancient and buried Tonawanda river; the recession of the Falls; the story of the lakes and the birth of Niagara; the fluctuations in the volume and descent of the river; the various episodes in the history of the river; the death of the Falls; the relation of the Falls to the ice age; how the Falls may be used to ascertain the antiquity of man.

UPHAM, WARREN. Origin and age of the Laurentian lakes and of Niagara Falls. (Am. geol., Sept., 1896. 18:169–177.) 1896 Upham

Pages 174–176 deal with the Beginning of the Niagara river and its erosion of the gorge below the Falls; the hypothesis of the Nipissing outlet from Lakes Huron, Michigan and Superior; the duration of Niagara Falls and the post-glacial period.

1897

GILBERT, GROVE KARL. Recent earth movement in the great lakes region. Extract from the 18th annual report of the United States geological survey. 1896–97. Pt. 2. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. 1899. 15:69–138.) 1897 Gilbert

In this paper Mr. Gilbert discusses the stability of the Laurentian lakes, using the surfaces of the lakes as datum levels or planes of reference. He comes to the conclusion that the plain of the whole lake region is being canted bodily toward the south-southwest and that consequently the waters of each lake are gradually rising on the southern and western shores or

1897 Gilbert falling on the northern and eastern shores, or both. Mr. Gilbert presents a plan for more precise measurement and more detailed investigation, and supplements his article with a digest of a cognate investigation by E. L. Moseley of the region north of Sandusky bay, the data in question being in accord with the results obtained by Mr. Gilbert in his own investigation.

It was an abstract of this article which was communicated to the American Association for the Advancement of Science at the Detroit meeting in August, 1897, and a fuller abstract was printed in the National Geographic Magazine for September, 1897.

1897 Upham UPHAM, WARREN. Niagara gorge and St. David's channel. (Geol. Soc. of Am. bul. Jan. 25, 1898. 9:101–110.)

This paper, which was read before the society December 30, 1897, takes up in detail: I. Niagara gorge (physical features in general, from Lewiston to the whirlpool, the whirlpool rapids. From the rapids to the Falls). II. Saint David's channel. (From St. David's to the whirlpool. Probable preglacial extent above the whirlpool. Effects of the recession of the Falls.) III. Effect of the Laurentian glacial lakes on the Niagara gorge erosion. (Glacial lakes above Niagara river. Glacial lakes below Niagara river.) IV. Epeirogenic uplifting contemporaneous with the glacial lakes. V. Epeirogenic movement continued to the present time. Duration of Niagara Falls and the Postglacial period. In his summing up the author rejects Spencer's computation of 32,000 years as the age of the Niagara river, and agrees with Gilbert's conclusion of 7,000 years as announced at the Buffalo meeting of the A. A. A. S. in 1886.

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1898 (The) Age of Niagara Falls. (Nature, Nov., 1898. 59:16.)

The age of Niagara Falls estimated at 10,000 years as a result of investigations by Professor Frederick Wright into the erosion at the mouth of the gorge.

Light on the age of Niagara. (Pub. opin., Oct. 20, 1898. 25:496.)

From *Science*, October 14.

1898 Merrill MERRILL, FREDERICK J. H. A guide to the study of the geological collections of the New York state museum. (Bul. of the N. Y. state museum. Nov., 1898. 4: No. 19. Albany: 1898. See index.)

Contains scattered information concerning the rock formations at Niagara.

The Niagara gorge. [A review of Taylor on "Origin of the gorge of the whirlpool rapids at Niagara."] (Science, May 6, 1898. New ser. 7:627.) 1898

When the gorge of Niagara was first ascribed to work of the river, it was tacitly postulated that the volume of the water and the rate of recession of the falls had been constant. This postulate gave way before the suggestion that variations in river volume may have occurred during the disappearance of the ice sheet. Now it is attempted to correlate these variations in volume on the one hand with the retreating ice front, the northeastward elevation of the land, and the temporary discharge of the upper great lakes across Ontario, and on the other hand with the breadth and depth of the gorge. A recent paper by Taylor on the "Origin of the Gorge of the Whirlpool Rapids at Niagara" (Bull. Geol. Soc. Am., IX, 1898, 59–84) explains the narrow part of the gorge, where it is crossed by the railroad bridges and occupied by the Whirlpool Rapids, as the work of the discharge of Lake Erie alone — that discharge being called the Erie-Niagara River — while the upper lakes ran to the St. Lawrence by the Nipissing-Mattawa channel, eastward from the then expanded Georgian Bay. Before the ice sheet had retreated far enough to open this outlet the upper lakes discharged through Erie, and the large volume of Niagara at that time caused the erosion of the wider gorge and deeper gorge just below and above the Whirlpool.

It is thus implied that the channel of Detroit River must have been laid dry while the Erie-Niagara was cutting its narrow gorge, and of this Taylor has found good evidence in the depth to which the valleys of small tributaries of the Detroit are eroded below the present river surface. The manner in which many independent factors are thus correlated is really of dramatic interest.

[Review of "Another episode in the history of Niagara Falls," by Joseph William Winthrop Spencer.] (Nature, Dec. 29, 1898. 59:214.) 1898

1898 [Review of " The age of Niagara Falls, as indicated by the erosion at the mouth of the gorge," a paper by Prof. G. Frederick Wright, read at the meeting of the A. S., Boston. 1898.] (Nature, Nov. 3, 1898. 59:16.)

1898 Spencer

SPENCER, JOSEPH WILLIAM WINTHROP. An account of researches relating to the great lakes. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. N. Y. and Albany: 1899. 15:139–159.)

This account is taken from the *American Geologist*, February, 1898, 21:110–123. It gives a brief review of the principal investigations into the lake history with special reference to the author's contributions to the subject. It was read before the American Association for the Advancement of Science, at the Detroit meeting August, 1897.

Twenty years ago very little was known of the history of the Great Lakes and of Niagara Falls. Since then the origin of the lake basins has been explained by the discovery of the buried and drowned ancient Laurentian River and its tributaries, the valleys of which have been obstructed by drift, their altitude above the sea now greatly reduced, and their respective barriers in part raised up by the recent unequal tilting of the earth's crust. . . .

The after-history of the lakes has been partly studied, for their old and now deserted shore lines have been approximately mapped over a large area, and the amount of subsequent tilting of these old water lines has been measured. The most interesting feature in their subsequent history is the change of outlets, both past and in prospect. Thus the three uppermost lakes discharged through Lake Huron towards the east, so that the Niagara did not receive any more than the waters of the Erie Basin until in a recent period. This discovery was first made by the writer in 1888,[1] although more recently Mr. F. B. Taylor, by a remarkable method of reasoning, has gone out of his way to ascribe it to another,[2] although this other has not so claimed it, so far as

[1] Proc. Am. Assn. Ad. Sci., XXVII, pp. 198–200, 1888.

[2] Bull. Geol. Soc. Am., vol. IX, p. 180, 1898. Am. Jour. Sci., ser. IV, 6:439 n.

is known to the writer. So also the rate of rise of the earth's crust throughout the lake region, and the consequent hypothesis announced at the same time that the Falls of Niagara would probably cease to exist in the near geological future, owing to the diversion of the waters the four upper Great Lakes to the Mississippi by way of Chicago, was first announced by the writer in 1894.[1] This has been confirmed by the subsequent researches of Prof. G. K. Gilbert,[2] with almost identical results when reduced to the same standard. In his paper (p. 602) Prof. Gilbert says: "So far as I am aware this paper broaches for the first time the idea of the differential elevation of the lake region, and it contains the only observations that have been cited as showing the recent changes of that character. In late years the subject has been approached from the geologic side, and Dr. J. W. Spencer has expressed his opinion that the warping or tilting of the whole region is now in progress." From the standpoint of measuring the changes of level of the lake waters, I believe that Prof. Gilbert is correct in his claim, but they only confirm the correctness of the previous geological determinations. The tilting of the beaches has been measured by several of us, but the direction of the tilting was determinable only after my surveys on the Canadian side of the lake enabled us to triangulate the direction of the rise, and in my papers between 1888 and 1891 this determination of the direction of the rise was calculated and shown only to be confirmed by all subsequent measurements, including the recent paper of Prof. Gilbert. But the difficulty awaiting us was that we did not know the rate of warping, for, if found for one district, it could be calculated for the whole lake region. Of course it was not an absolute rate of rise, but the differential rise of the lake region. However, I found that during the last 1500 years the mean rise in the Niagara district was from 1¼ to 1½ feet per century, as compared with Chicago.

1898 Spencer

[1] Am. Jour. Sci., XLVIII, pp. 455–72, 1894.

[2] 18th Ann. Rep't U. S. Geol. Surv., p. 639, 1898.

1898
Spencer

To make it a measurement of the absolute rise would be to add or subtract the changes of the earth's crust at Chicago, which are not known. But the rate of rise north of the Adirondack district was three times as great, and so on for other regions. With this mean rate of rise discovered as in progress for the last 1500 years, it becomes no bold prediction to apply it to the diversion of the Niagara drainage to the Mississippi and the consequent extinction of the Falls. This hypothesis was first announced in March, 1894, or three and a half years before it was confirmed by Mr. Gilbert's estimates of the fluctuations of the lakes. The results of the latter methods almost exactly confirm the earlier geological discoveries of a rise of the earth's crust, and the consequent confirmation of the hypothesis of the extinction of Niagara, at about the same date, when the calculations are reduced to the same basis.

The history of the Falls is so intimately connected with that of the lakes, and in their archives we find that there have been several changes in the height of the Falls as well as great variations in the amount of water that passed over them during the different episodes. All of these studies are gradually leading us to more and more nearly approach the correct determination of the age of the Falls. [*Preface.*]

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But the great impetus towards the investigation of the great lakes is due to Prof. J. S. Newberry, whose contribution was followed by one from Prof. E. W. Claypole. To give a full account of the researches concerning the great lakes, and to tell how each author had contributed to the subject would make a very long chapter. As the present writer has been so closely connected with the pioneering study of the subject, and has announced progress from time to time before the American Association, it seems a fitting opportunity to tell how his investigations have been influenced by his co-workers, leaving to others the narration of the most recent studies.

Newberry followed up on the lines of Ramsay in attributing

the basins of the lakes to glacial excavations, yet there was a counter current in his writings which finally advocated that the glacial excavation had taken place only after their courses had been predetermined by river action. Adopting the teachings of Agassiz and Newberry, and going much farther, an influential school was developed which attributed the superficial features of the northern regions almost entirely to the action of continental ice — in spite of the teachings of Lesley, Dawson, Whitney and others. The extreme views, as represented by Dr. G. J. Hinde,[1] made the ice plough dig out the St. David's, Dundas and other valleys, irrespective of their direction, as compared with that of the ice flow. Such speculations were most common at the close of the eighth decade of the century, when the writer commenced his studies upon lacustrine history — concerning which his first paper was the " Discovery of the Outlet of the Basin of Lake Erie," [2] etc. (1881). The appearance of this " avant courier " was due to the enthusiastic reception given by Prof. J. P. Lesley to the writer's discovery of the reduction of rocky barriers beneath the superficial drift between Lake Erie and the Dundas Valley, at the head of Lake Ontario, indicating an outlet for the Erie basin by a channel, the lower end of which is deeply buried by drift deposits. Prof. Lesley pointed out that this discovery satisfied the necessity for some such outlet to the Erie Basin, as Hunt and Newberry had found buried channels beneath the lake, and Mr. J. F. Carll had discovered that the drainage of the Upper Allegheny and other streams had been reversed, having flowed northward into the Erie basin in preglacial days.

1898 Spencer

The writer's paper referred to not only described the outlet of the Erie Basin, but also showed that the Niagara River was not needed in ancient times. Shortly afterwards this idea was

[1] Glacial and interglacial strata of Scarboro Heights, etc. Can. Jour., Apr., 1877, p. 24.

[2] Discovery of the Preglacial Outlet of the Basin of Lake Erie into that of Lake Ontario; with notes on the origin of our Lower Great Lakes. Spencer; Proc. Am. Phil. Soc., XIX, 198, 2n., Mar. 30, 1881, pp. 300–337.

1898 Spencer

confirmed by Dr. Julius Pohlman [1] who found that the Niagara channel was not sufficiently deep for the drainage of the buried valleys in the vicinity of Buffalo.

In the same paper the valley-like features beneath the lake waters were analyzed and established. But at that time the course of the ancient drainage could not be traced beyond the meridian of Oswego. The writer also objected to the theory of the glacial excavation of the basins on account of the stream-like sculpturing of the land and the sub-lacustrine escarpments; and on account of the glaciation of the region being everywhere at sharp angles to the escarpments, whether above or below the surface of the lakes. These views and the discovery of the outlet for the ancient Erie Basin confirmed the teachings of Prof. J. P. Lesley, who, from being a progenitor of the science of topography, became the father of geomorphy, of which the lake history is one of the phases. In speaking of the origin of the lake valleys, Prof. Lesley [2] says: "For a number of years I have been urging upon geologists, especially those addicted to the glacial hypothesis of erosion, the strict analogy existing between the submerged valleys of Lakes Michigan, Huron and Erie and the whole series of dry Appalachian 'valleys of VIII,' stretching from the Hudson River to Alabama; also of Green Bay, Lake Ontario and Lake Champlain, with all the 'valleys of II and III.' One single law of topography governs the erosion of them all, without exception, whether at present traversed by small streams or great rivers, or occupied by sheets of water, the only agency or method of erosion common to them all being that of rainwater, not in the form of a great river, because many of them neither are nor ever have been great waterways."

Notwithstanding the shortcomings and what are now known to be errors of detail, the paper on the preglacial outlet of Erie

[1] The Life-history of Niagara. Pohlman. Trans. Am. Inst. Min. Eng.

[2] Rept. Q. Geol. Sur. Pa., 1881, pp. 399–406.

attracted considerable attention as a new departure, and at the time Prof. James Geikie, who is well known to be one of the leading glacialists, expressed himself as follows, under date June 21, 1881: "I have always had misgivings as to glacial erosion of the Great Lakes, . . . and now your most interesting paper comes to throw additional doubt upon the theory in question. Possibly those who have upheld that view will now give in. Your facts seem, to me at least, very convincing. I never could understand how those great lakes of yours could have been ground out by ice. The physical conditions of the ground seem to me very unfavorable." Prof. G. K. Gilbert, on June 15, 1881, wrote: "My first geological field work was in the drift of the Erie basin, and the problem of the origin of the basins of the great lakes has always had great attraction for me. Had I been able to understand its solution, my working hypothesis would have been that which you have demonstrated so thoroughly. . . . The matter has certainly never received a demonstration until your paper appeared. . . ." 1898 Spencer

At this time the writer was struggling to find the outlet of the basins, and looked in every possible direction for buried channels without avail. While the St. Lawrence valley, beyond the outlet of lake Ontario, was evidently only a continuation of the drowned valley occupied by the lake, and while the lower St. Lawrence indicated an elevation of the continental region to more than 1,200 feet (when the cañon of the Saguenay was being excavated), the evidence of the local oscillation of the earth's crust was not yet forthcoming. The deep cañon of the Dundas valley, and the observations of Prof. Gilbert that the Irondequoit bay was drowned to a depth of 70 feet, was taken as evidence of terrestrial oscillation, but later the writer found that the St. Lawrence, after leaving Ontario, was in part flowing over a valley buried or drowned to a depth of 240 feet; accordingly the Dundas and Irondequoit valleys were no evidence of local oscillation, which had to be found elsewhere.

1898
Spencer

In concluding a notice of this early work,[1] the modern aspect of the Niagara River was emphasized, and the valley of St. Davids was regarded as of inter-glacial origin — in deference to the prevailing theories of the time — in place of being, as is now known, the channel of an insignificant stream of greater antiquity. The Finger lakes of New York were explained as closed up valleys which had formerly drained the rivers of the highlands of New York, as for example Seneca lake, which has since been found to be the ancient course of Chemung and its tributaries. About this time the writer, from the data collected by the Geological Survey of Pennsylvania, pointed out the probability that the Monongahela and upper Ohio had formerly been reversed and drained into the Erie valley.[2] This hypothesis was afterward amplified by Dr. P. Max Foshay,[3] disputed by Prof. I. C. White; modified and confirmed by Mr. F. Leverett,[4] and finally, with some modifications, reconfirmed by Prof. I. C. White.[5] In order to test the validity of his objections to the hypothesis of glacial excavation, the writer visited Switzerland and Norway for the purpose of personally observing the mechanical effects of modern glaciers, with the result that he saw in them only the agents of abrasion — the ice moulding itself round obstructions, or smoothing off irregularities, and not ploughing out channels.[6] Indeed, in a more recent visit to Norway, it became apparent that the great glacial valleys

[1] A short study of the features of the Great Lakes. Spencer. Proc. A. A. A. S., vol. XXX, 1881, pp. 131–146; Surface Geology of the Region about the western end of Lake Ontario. Spencer; Can. Nat., vol. X, 1882, pp. 213–236, 265–312.

[2] On the ancient upper course of the Ohio river emptying into Lake Erie. Proc. Am. Phil. Soc., Phila., XIX, 1881.

[3] Preglacial drainage and recent geological history of western Pennsylvania. Am. Jour. Sci., vol. XL, 1890, pp. 397–403.

[4] Pleistocene fluvial plains of western Pennsylvania. Am. Jour. Sci., XLII, 1891, pp. 200–212; and Further studies of the Upper Ohio basin. Am. Jour. Sci., XLVII, 1894, pp. 247–283.

[5] Am. Geol., vol. XVIII, 1896, pp. 368–379.

[6] The erosive power of glaciers as seen in Norway. Geol. Mag., Lond., Dec. iii, vol. IV, 1887, pp. 167–173.

still preserve many base levels of erosion — the doctrine of which has not been applied to them, and consequently their history is as yet unwritten. The extreme views concerning glacial erosion, held a decade ago, are now greatly modified and do not belong to the present day. 1898 Spencer

In 1882, fragments of great beaches, and others which were delta deposits, were described as occurring about the western end of Lake Ontario at various elevations from 500 feet above the lake down to its present level.[1] Other fragments of beaches had been known for many decades, the most notable of which were the ridge roads of New York state, that Prof. James Hall, as early as 1842, found to be rising gently upon proceeding eastward;[2] and the same was found to be true at the eastern end of Lake Ontario. About this time Prof. Gilbert was studying the beaches of the western lakes, and Mr. Warren Upham those of the Winnipeg basin. The beaches in both places were found to record the evidences of gentle terrestrial movements. Following up his investigations, Prof. Gilbert connected the various fragments of a great beach upon the southern and eastern sides of Lake Ontario, as far as Adams Centre, near Watertown, N. Y.,[3] and found that the old waterline was deformed to the extent of several hundred feet in proceeding northeastward. This was an admirable piece of work, which was invaluable to the writer, who extended the observations further[4] and made use of them in measuring the amount of the long sought for terrestrial deformation as the outlet of Lake Ontario, and found that these post-glacial movements were sufficient to account for the rocky barrier across the Laurentian valley, producing the basin which retains the waters of Lake Ontario. The channels across this rocky barrier, however, were closed with drift deposits reaching

[1] Surface geology about the region of the western end of Lake Ontario, cited before.

[2] Geology of N. Y. Vol. IV, 1843, p. 351.

[3] Rept. A. A. A. S., Science, Sept., 1885, p. 222.

[4] The Iroquois beach; Spencer. Trans. Roy. Can., 1889, pp. 121–134. Read Phil. Soc., Wash., Mar., 1888.

1898
Spencer

to a depth of 240 feet. In thus establishing the ancient drainage of the Ontario basin, after years of observation, often representing but little progress, the phenomena of the basin were discovered without the glacial theory of erosion. Then the writer found that the drowned channels across Lake Huron, and passing through Georgian bay, continued beneath hundreds of feet of drift, eastward of the Niagara escarpment, and joined the Ontario valley a few miles east of Toronto. A similar channel (the Huronian) crossed the State of Michigan, passed through Saginaw bay, and over the sub-lacustrine escarpment, to the deeper channel of the Huron basin.[1] The Erie (Erigan river) drainage had been found to pass into the head of the Ontario basin. Thus was discovered the course of the ancient Laurentian river and its tributaries of antiquity. These upper basins were also affected by the terrestrial tilting recorded in the beaches, as well as by the drift obstructing them.

Prof. Gilbert, who had, many years before, mapped beaches at the head of lake Erie,[2] afterwards measured the deformation recorded in the deserted shore at the eastern end of the lake;[3] while the writer surveyed the old water margins across Michigan, and on the Canadian sides of Lakes Ontario, Erie and Huron, and in portions of New York.[4] After this, very little work was done upon the deserted shores for several years, when Mr. F. B. Taylor commenced his researches about the northeast portion of Georgian bay, Lake Michigan, etc.,[5] and Dr. A. C. Lawson

[1] Origin of the basins of the Great Lakes. Q. J. G. S. (Lond.), vol. XLVI, 1890, pp. 523–533.

[2] See Geology of Ohio, II, 1874.

[3] The history of the Niagara river. 6th Rep't Com'rs State Reserv. Niag. 1890, pp. 61–84.

[4] The Iroquois beach, cited before. Deformation of the Iroquois Beach and Birth of L. Ontario, Am. Jour. Sci., XL, 1890, 443–451; Algonquin Beach and L. Huron, XLI, 1891, 11–21; High Level Shores in the Region of the Gt. Lakes, and their Deformation, XLI, 1891, 201–211; Lundy Beach and L. Erie, XLVIII, 1894, pp. 207–212.

[5] Numerous papers recently published in Am. Jour. Sci., Am. Geol., and Bull. Geol. Soc. Am.

carried on similar observations north of Lake Superior,[1] and Prof. H. L. Fairchild in New York. The deserted beaches show but little terrestrial oscillation about the western end of lake Erie, but it increases towards the northeast and amounts from four to seven feet per mile. 1898 Spencer

With the surveys of the deserted beaches, new questions arose concerning the history of the lakes and of Niagara River, which forms an inseparable chapter. At the same time, opposing hypotheses presented themselves.

None of the beaches have been fully surveyed. They occur at various altitudes from near the greatest elevation of the land down to the levels of the lakes, and they have not always been separated from other Pleistocene deposits. While there are questions as to the higher forms, those from lower levels have undoubtedly been accumulated about extensive bodies of water — the character of which is the subject of disagreement. The writer has regarded them as accumulations at sea-level, and other observers as margins of glacial lakes, irrespective of their elevation. The theoretical aspect is not one likely to be settled speedily. Those who advocate the glacial character of the lakes have sought to terminate the beaches against morainic deposits to the northeast, but their ice dams have been frequently thrown along lines beyond which the beaches have subsequently been traced. Thus Prof. Claypole [2] made ice dams in Ontario where open water, bounded by beaches, was afterwards found to prevail. At Adams Centre, Prof. Gilbert drew an ice dam for the Ontario basin, beyond which, however, the writer found that the old shore line extended, and this was later confirmed by Prof. Gilbert. Mr. Leverett made an ice dam at Cleveland, beyond which the writer has been informed by two observers that the beach extends, and Prof. Gilbert and Mr. Leverett described another glacial dam near Crittenden, N. Y., beyond which the

[1] Sketch of the coastal topography of north side of Lake Superior. 20th Rep't of Geol. Surv. Minnesota, 1891, pp. 181–289.

[2] Rept. of meeting A. A. A. S., Science, Sept., 1895, 222.

1898 Spencer

beaches have been discovered by Prof. Fairchild. Another diagnosis of the glacial lake is the occurrence of gravel floors over low divides, which are regarded as the outlets of them, and upon this feature alone many such lakes have been named. But the advocates of these glacial outlets have not explained how the terraces (at hundreds of feet above the drainage) upon the southern side of them are indistinguishable in character from those upon the northern side.[1] If these supposed outlets be evidence *per se* of glacial dams then the most perfect which the writer has ever seen may be found within 16° of the equator, at an altitude of less than 800 feet, suggesting that the Mexican gulf had a glacial dam, discharging into the Pacific ocean across the Isthmus of Tehuantepec — a suggestion which no one would seriously consider. The writer has also presented the hydrostatic objections[2] to the impossible long continuance of some of the supposed dams, the location of which demands their drainage across ice itself, which would soon be penetrated by the warmer waters so as to reduce their level. By straightening out the deformation recorded in the deserted shore-lines, some of the beaches are shown to have undoubtedly been formed at sea level.[3] While recent surveys report the discovery of additional glacial lakes, or the splitting up of those first described under new names, the survey of the high level terraces in the mountain regions has suggested to the writter counterbalancing evidence of the occurrence of glacial dams, but this is a study which has been postponed, partly on account of the prejudice against post-glacial subsidence and partly on account of the writer's absorption in other questions of physical changes. Whatever may be the ultimate fate of the theory of glacial dams, the opposing

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[1] Channels over divides, etc., Spencer, Bull. Geol. Soc. Am., vol. III, 1891, p. 491.

[2] Post-Pliocene continental subsidence versus ice dams. Spencer. Ibid., II, pp. 465–476, 1890.

[3] The Iroquois beach, etc.

hypotheses have given zest to the investigations to the degree of advancing our knowledge of the lake history. 1893 Spencer

In the survey of the beaches, besides the terrestrial deformation recorded, there seems to be no more important discovery than when the writer found how the Huron, Michigan and Superior waters (the Algonquin gulf or lake) originally emptied to the northeastward of the Huron basin in place of discharging into Lake Erie; after which, by the northeastern tilting of the land, "the waters were backed southward and overflowed into the Erie basin, thus making the Erie outlet of the upper lakes to be of recent date."[1] This conclusion was established by the survey of the Algonquin beach which recorded the necessary tilting. The first survey was suspended near Balsam lake, where an overflow was found; and, accordingly, in the original announcement, the generalizations were not carried farther; although there was a lower depression in the vicinity of Lake Nipissing, which was shortly afterwards made use of by Prof. Gilbert [2] and the writer. With the further elevation of the land, the lower beaches — partly measured at that time (1887–8) — represented the surface of the Algonquin water discharging by the Nipissing route alone.[3] This has since been worked out by Mr. Taylor.[4]

Co-existing with the Algonquin gulf or lake was the Lundy gulf or lake, occupying part of the Erie basin, and extending into the Ontario, having substantially the same level. Both of these bodies of water extended much farther towards the northeast than their successors, although more contracted in the opposite directions — the effect of the more recent tilting of the land. Prior to the existence of these separate bodies of water, higher shore-lines were formed, and the great gulf or lake bounded by

[1] Proc. A. A. A. S., XXXVII, 1888, p. 199.

[2] Hist. of the Nipissing river.

[3] Deformation of the Algonquin beach, etc., cited before.

[4] Ancient strait of Nipissing. Taylor. Bull. Geol. Soc. Am., vol. V. 1893.

1898
Spencer

them was called the Warren water, which name the writer has defined as applicable to the great open water of the region, until after the formation of the Forest Beach — its most perfect episode — after which it was dismembered into the Algonquin and Lundy waters.[1]

During the changing stages of Warren water, its configuration was somewhat varied but not sufficiently to call the water by a multiplicity of names, according to the changing levels. The old shore lines form prominent features, requiring nomenclature for the most important. And additional naming only adds confusion. Some of the beaches have been renamed by Mr. Leverett,[2] contrary to the usage of naturalists.

With the continued elevation of the land, the Algonquin water sunk to the level of the Nipissing beach (of Taylor) and the Lundy became dismembered, and formed an insignificant Lake Erie.[3] In the Ontario basin, the water sunk to the Iroquois beach and lower levels, and Niagara Falls had their birth, after the river had first been a strait. Remnants of beaches of that time were long ago observed, not only in the vicinity of Niagara, but also at the head of the lake. With the temporary pauses recorded, the waters of the upper level were speedily lowered to that of the Iroquois beach, and then the Niagara river descended only 200 feet, in place of 326 feet, as at present. The effect of this diminished descent upon the excavating power of the falls was first pointed out by the writer in 1888[4] and published in 1889. With the continued lowering of the waters in Ontario basin, the descent of the Niagara increased to 80 feet more than at present, as first shown by Prof. Gilbert; but later, by the tilting of the earth's crust north of the Adirondack mountains, the outlet of

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[1] High level shores, etc., cited before.

[2] On the correlation of the New York moraines with the raised beaches of Lake Erie. Leverett. Am. Jour. Sci., vol. L, 1895, pp. 1–20.

[3] Proc. A. A. A. S., 1888, p. 199.

[4] Iroquois beach, etc. Trans. Roy. Soc. Can., 1889, p. 132.

the Ontario basin was raised, causing the backing of the waters so as to reduce the descent of Niagara river to its present amount. 1898 Spencer

In 1886, after the third survey of Niagara Falls (by Prof. Woodward), the rate of recession was found to be much greater than had formerly been supposed. Prof. Gilbert then made a short study of the falls, the conclusions concerning which are summed up as follows by that author:[1] "The problem admits of expression in an equation:

$$\text{Age of gorge equals } \frac{\text{Length of gorge.}}{\begin{array}{l}\text{Rate of recession of falls.} \\ -\text{Effect of antecedent drainage.} \\ -\text{Effect of thinner limestone.} \\ -\text{Effect of thicker shales.} \\ -\text{Effect of higher fall.} \\ -\text{Effect of more floating ice.} \\ \pm\text{ Effect of variation of detrital load.} \\ \pm\text{ Effect of chemical changes.} \\ \pm\text{ Effect of changes of river volume.}\end{array}}$$

"The catchment basin was formerly extended by including part of the area of the ice sheet; it may have been abridged by the partial diversion of Laurentian drainage to other courses." He had divided the length of the gorge by the maximum rate of recession, finding the product to be 7,000 years. If the equation be carefully examined, together with the cited quotation, all the important changing effects in the physics of the river would lessen the estimated age of the cataract below 7,000 years, except the effect "by partial diversion of the Laurentian drainage to other courses," of which no evidence was suggested; nor was any lengthening of time shown as necessary, by the long interior height of the falls. Henceforth, Prof. Gilbert was naturally quoted as an authority that the age of the falls was only 7,000 years. This conclusion did not satisfy the writer,

[1] The place of Niagara Falls in geological history. Gilbert. Proc. A. A. A. S., vol. XXXV, 1886, pp. 222–223.

1898 Spencer

who from the evidence of the beaches, especially the Iroquois,[1] found that the rate of recession must have been for long ages much less than now, on account of the interior height of the falls; and also on account of the greatly diminished volume of water, owing to the overflow of the upper lakes to the northeast, until in recent days. But how much of the work of the falls had been done before the upper lakes were turned into the Niagara drainage, for a long time seemed undeterminable, until the features of Foster's flats were used for measuring the amount of work performed in that early episode. This standard has since been confirmed by other phenomena not yet published; and from a different standpoint the distance of the early recession has been agreed to by Prof. Gilbert, who now considers the age of the falls far greater than that formerly suggested by his paper in 1886. From all the available data up to 1894, the writer computed the age of Niagara Falls at 32,000 years.[2] Of the various episodes, that of the cataract passing the narrows of the whirlpool rapids still seems the most difficult of explanation; but the writer has recently found that the narrows record a second reduction in the amount of fall in the river, before the present descent was established, thus retarding the recession along this section of the gorge, and increasing in part the time compensation for the reduced amount of work performed. However, further discoveries are necessary to fully explain the phenomenon of the narrows. It now seems probable that the error in determining the time required for the recession of the falls through the section of the whirlpool rapids would not affect the computation of the whole age of the river by more than a few per cent.

No less important than the determination of the age of the river was that of the date when the waters of the Algonquin basin

[1] Trans. Roy. Soc. Can., 1889, p. 132. Proc. A. A. A. S., 1888, p. 199.

[2] Duration of Niagara Falls. Am. Jour. Sci., vol. XLVIII, 1894, pp. 455–472.

(Huron, Michigan and Superior) were first turned into the Niagara drainage, owing to the warping of the land, with the greatest rise occurring along an axis trending N. 28° E.[1] The date of the diversion of the waters of the upper lakes from the Ottawa to the Niagara valley has been computed by the writer at 7,200 years. This result was obtained from the mean of three distinct methods of computation, varying from 6,500 to 7,800 years.[2] Mr. F. B. Taylor's more recent estimate gives the range of from 5,000 to 10,000 years. 1898 Spencer

Niagara as a time piece would be incomplete without indicating the changes in the near future. From the northeastward tilting of the lake region, it was computed that in 5,000 years, not merely Niagara Falls would cease to exist, but also that the drainage of the deepest part of the Niagara river at Buffalo (45 feet) would be reversed and turned into lake Erie, whose outlet would then be through lakes Huron and Michigan into the Mississippi river by way of Chicago. This inference was based upon the long delayed discovery of the rate at which the earth's crust has been rising in the lake region,— which was found to be for the Niagara district 1.25 feet per century more than the rate of rise at Chicago.[3] With this determination it was easy to calculate the rate of terrestrial deformation for other regions,— thus northeast of Lake Huron the rise has been found to be two feet per century, and north of the Adirondacks, the warping is progressing at 3.75 feet in a hundred years.

The rate of deformation of 1.25 feet per century, in the Niagara district, was the minimum calculation, with a possible maximum of about 1.5 feet per century. The approximate correctness of the determination has just been confirmed by a paper presented to the American Association, by Prof. G. K.

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[1] This direction occurs east of Georgian bay, while at the end of Lake Ontario the direction is N. 25° E. See papers cited above.

[2] Duration of Niagara Falls, cited above.

[3] Ibid.

1898
Spencer

Gilbert, immediately before this communication was read.[1] He had used the bench-marks at various localities where the fluctuations of the lake levels have been registered the last 20–37 years. While the recorded measurements vary from about one to two and a half inches during the periods of observation, they have been extended over the lake region, with results closely agreeing with the previous determinations of the writer. This will be better understood using Professor Gilbert's application — namely,— that in 500–600 years, the Erie waters would be on a level with those of lake Huron — in 1,000 years they would overflow the natural divide near Chicago — in 2,500 years, the waters would cascade into the Niagara gorge only during high water — and in 3,000 years, the falls would be entirely drained. These changing conditions, based upon the writer's previously discovered rate of terrestrial deformation, would take — 720 years for the Erie and Huron waters to be on the same level; 1,280 years for the overflow into the Mississippi drainage (the artificial canal would reduce this estimate to 720 years); and 2,600 years for the general drainage of the lakes into the Mississippi. In 5,000 years the whole river as far as Buffalo would be drained towards the south.

In spite of taking the minimum rate of recession and the probable errors, the closeness of these results satisfactorily confirms many of the calculations based upon Niagara as a geological chronometer.

This paper, giving the principal results of investigations into the lake history, thus shows the writer to have been greatly affected by the studies of his co-workers. Indeed, all of the researches by the different observers have been very much dovetailed, so that our present knowledge of the history of the Great Lakes and Niagara Falls is the result of the labors of many individuals. Besides the names of those already mentioned, we should add those of Shaler, Tarr, Wright, Russell, Upham,

[1] Modification of the Great Lakes by earth movements. Nat. Geog. Mag., vol. VIII, 1897, pp. 233–247.

Kibbe, Lincoln, Brigham and Scovill with the names of Hall and Lyell, too well known to need special mention. 1898 Spencer

To complete the review, mention should be made of the writings of Mr. F. B. Taylor, in connection with his important survey of the Nipissing outlet of the Algonquin basin, and of the dissected shore lines of the upper lakes; and of the important investigation of Central New York by Professor Fairchild.

The following is printed as an appendix to the preceding article:

The recent paper on "Another Episode in the History of Niagara" by the writer is important in its showing that after the waters of Lake Ontario had reached their lowest state, and the Niagara its highest fall, the waters of the Ontario basin were backed up into the then made gorge, owing to the progressive tilting of the earth's crust at the outlet of the lake, so that the waters rose in the Niagara gorge to a height of 75 feet above their present level, and thus reduced the efficiency of the Falls, while they were receding past the section of the whirlpool rapids; thus this diminished height helps to explain the shallowness of the Niagara river along this section. The waters were again lowered to their present level by the St. Lawrence cutting down its channel more deeply into the rim of the water basin. In this paper there is also a revision of the episode of the Falls, correcting and reducing to greater accuracy the previous investigations.

SPENCER, JOSEPH WILLIAM WINTHROP. Another episode in the history of Niagara Falls. (Am. jour. sci., Dec., 1898. 156 (ser. 4, 6): No. 36, 439–450.)

A paper read before the American Association for the Advancement of Science in 1898. It deals with the following topics: A summary of the changing physics of the river; a revision of the episodes of the Niagara river; the newly discovered espisode — the Niagara strand; the modern episode; the rise of Ontario waters; the narrows of the gorge at the whirlpool rapids. The new episode is thus described: "After the river reached its maximum descent of 420 feet, the surface of Lake Ontario was gradually raised 75 feet above the present level and the waters stood in the

1898 Spencer

Niagara gorge so as to reduce the descent of the river to 250 feet, before the final lowering of the Ontario waters to a level of 326 feet beneath those of Lake Erie." This discovery, says Dr. Spencer, "will be found to explain the greater shallowness of the channel of the whirlpool rapids than below or above."

SPENCER, JOSEPH WILLIAM WINTHROP. Niagara as a time-piece. (Proc. of the Can. Inst., new ser. May, 1898. 1: pts. 4 and 5. 101–103.)

A brief history of the gradual development of knowledge concerning the physics of the Niagara river.

1898 Taylor

TAYLOR, FRANK BURSLEY. Origin of the gorge of the whirlpool rapids at Niagara. (Bull. Geol. Soc. Am. 1898. 9:59–84.)

1898 Upham

UPHAM, WARREN. The age of Niagara Falls as indicated by the erosion at the mouth of the gorge. (Sci., Oct., 1898. N. s. 8:502.)

A discussion of Professor Wright's theory.

1898 Wright

WRIGHT, GEORGE FREDERICK. The age of Niagara Falls as indicated by the erosion at the mouth of the gorge. (Sci., Oct. 14, 1898. 8:502.)

A summary.

1899

1899 Rafter

RAFTER, GEORGE W. Water resources of the state of New York. Pt. 1. (Water-supply and irrigation papers of the United States geological survey. No. 24. Wash.: 1899. Pp. 24–25, 48, 58–63.)

A brief summary of the figures for the elevation of the river and the Falls and a short discussion of the run-off of the Niagara river. The author feels that "at present the data are insufficient for showing what the run-off of Niagara River really is."

As an additional source of loss from the Great Lakes the proposed ultimate diversion of 10,000 cubic feet per second through the Chicago drainage canal to the head waters of Illinois River may be referred to. Thus far the discussion of such loss has been mainly conducted on the supposition that the mean discharge of the Great Lakes at Niagara was about 265,000 cubic feet per second. If this were true the ultimate injurious effect of such diversion could only appear during a series of extremely dry years. The author cannot but think that

this whole question of the run-off of Niagara River has become fogged by a discussion based thus far purely on averages. What we really want to know is the run-off of a cycle of dry years. With such data we can compute the effect of a given diversion more satisfactorily than when dealing with means. 1899 Rafter

With a cycle of rainfall years, either high or at about the average, it is probable that very little effect from such diversion will be observed, the consensus of opinion at the present time apparently being that it will not exceed about 0.3 to 0.4 foot in depth over the areas affected. Owing to the balancing of conditions due to the immense pondage of the Great Lakes, and which requires years in order to complete a cycle, it is uncertain whether the abstraction of 10,000 cubic feet per second at Chicago would be especially detrimental at Niagara Falls, although in years of extreme low flow it is probable that it would be easily apparent. If, however, the minimum flow of Niagara River is really as low as 150,000 to 180,000 cubic feet per second, it is clear that the loss of 10,000 cubic feet per second will be a matter worth taking into account.

WRIGHT, GEORGE FREDERICK. New method of estimating the age of Niagara Falls. (Pop. sci. mo., June, 1899. 55:145–154.) 1899 Wright

The new evidence lies in the extent of the enlargement of the mouth of the Niagara gorge at Lewiston since the recession of the falls began. . . . The estimate of about ten thousand years for the date of that stage of the Glacial period in which Niagara River first began its work of erosion at Lewiston (an estimate which is supported by a great variety of facts independent of those relating to Niagara gorge) is strongly confirmed by this new line of evidence.

1900

Geology of Niagara. (Sci. Am. sup., March 3, 1900. 49:20208.) 1900

This article agrees with Spencer's theory of the origin of Niagara, giving briefly the geological history of the great lakes and Niagara.

1901

1901 Currie

CURRIE, P. W. On the ancient drainage of Niagara Falls. (Trans. of the Can. Inst. Aug., 1901. 7:pt. 1. No. 13:7–14.)

A brief, clear account in which the writer "has gone over the ground confirming and adding proofs to the statements of others." He takes up first the course of the preglacial Tonawanda river in Canada, and then discusses his hypothesis of the mode of gorge formation and the character of the floor of the gorge. He accepts the theory of Dr. J. W. Spencer as to the old water-courses. There are several fine photographic illustrations, also some diagrams of soundings and test-borings at the Michigan Central Railroad bridge taken from the engineer's report.

CURRIE, P. W. On the ancient drainage at Niagara Falls. (Geog. jour., Dec., 1901. 18:642.)

1901

(The) "Fool Killer" taking soundings. (Sci. Am., Oct. 5, 1901. 85:211.)

These soundings, made in September, 1901, disclosed the fact that the bed of the river is very uneven, varying from fifteen to one hundred feet in depth.

1901 Grabau

GRABAU, AMADEUS W. Guide to the geology and paleontology of Niagara Falls and vicinity, with a chapter on postpliocene fossils of Niagara by Elizabeth J. Letson. (Bull. of the N. Y. state museum. April, 1901. No. 45, vol. 9. Also Bull. of the Buf. Soc. of Nat. Sci. Vol. 7, No. 1. Pp. 284.)

A thoroughly scientific and exceedingly well-written treatise on the physical geography of the Niagara region, the life history of the Falls, the stratigraphy of the region and its fossils, prefaced by a very interesting chapter on "Niagara Falls and how to see them." The book is effectively illustrated throughout by views and diagrams. The purpose of the book is well set forth in the preface written by John M. Clarke, State Paleontologist. We quote:

With the support and cooperation of the Buffalo society of natural sciences and the department of paleontology of the state museum, Dr. Grabau has prepared this guide to the geology and paleontology of Niagara falls and vicinity with the special purpose of affording to visitors to Buffalo during the season of the Pan-American exposition in 1901 a viaticum in their tours through this region renowned for its scenic features and classic

in its geology. The ground has been the subject of a multitude of scientific treatises. . . . In no one place however has the general purport of all these various studies been brought together so that the intelligent traveler or student can acquire them in convenient form. It is for this reason that Dr. Grabau's work in bringing together in concise form the essence of these investigations, tempered and proved by his own review of them in the field, will not fail to prove serviceable to a large element of the public. 1901 Grabau

It is hardly necessary to say that the various theories have been most fairly and impartially reviewed. Mention should perhaps be made of the helpful bibliography of Niagara and the Great Lakes which has been appended to the work.

This same valuable article forms the appendix to the Eighteenth Annual Report of the Commissioners of the State Reservation at Niagara, and contains also a *Partial Bibliography of the Geology of Niagara and the Great Lakes.*

GRANT, G. C. Niagara Falls as an index of time. (Hamilton Scientific Assn. jour. and proc. 1901. 17:78–83.) 1901 Grant

A statement of the difficulties of determining time by geologic strata, and especially by the receding of Niagara Falls; with some reference to time as determined by paleontological methods.

HITCHCOCK, C. H. The story of Niagara. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: 1901. 17:75–107.) 1901 Hitchcock

Reprinted from the *American Antiquarian*, 1901. "The story of the gorge, then, shows much complication. It will be our task to state what the principal events in the history of this region have been, so as to be able to judge of the value of computations based upon the work performed." Among the topics discussed are the early geological history, the advent of the ice age, the reality of St. David's channel, the erosion of the lower gorge, the history of the Great Lakes, the upper section of the gorge, the recession of the cataract, estimates of the age in years, these constituting the principal events in the Niagara district.

There is, so far as is known, no better locality than the region of the Niagara gorge to afford an insight into the length of time that has elapsed since the disappearance of the ice-sheet

1901
Hitchcock

from the northern United States. At first it was thought to be a very simple problem. Given a gorge seven miles long, known to be lengthening annually by a definite number of feet and inches, we can ascertain the number of years required by dividing the sum total of feet by the annual recession. This result is believed to represent the period that has elapsed since the ice age, because the Niagara River commenced its existence in consequence of the damming of the ancient Erie (Erigan) River. The original channel having been blocked, Lake Erie accumulated, and its lowest line of exit was by way of the Niagara River. Sir Charles Lyell in 1841 estimated this period to have been about 36,000 years. He supposed the annual wear to be one foot. The latest figures indicate the amount of recession to be four times as great. Hence, if there were nothing more to be said, our conclusion must be that the time needed was only one-fourth of 36,000.

But this estimate must be modified by a careful consideration of various factors. It must be conceded that the Niagara River began to flow only after the obliteration of the Erigan Channel. Then the peculiar elbow at the whirlpool indicates a second blockade, and consequent divergence of the river toward Lewiston; for in none of the numerous canons of the West do we find any such arrangement. The gorge varies greatly in width and depth, as if the volume of the river had been diminished at times. Again, the work may have been interrupted by another glacial blockade, or modified by the presence of lakes not now existent. The story of the gorge, then, shows much complication. It will be our task to state what the principal events in the history of this region have been, so as to be able to judge of the value of computations based upon the work performed.

. . . . .

In the study of the geological history of the vicinity of Niagara, three great periods may be designated, each characterized by peculiar conditions. First, the laying down of the crystalline foundations; second, the deposition of the Silurian and later

NIAGARA FALLS FROM THE FERRY

Painted by W. H. Bartlett; engraved by J. Cousen. Published in London by George Virtue, 1837

sediments upon the Archaen; third, erosion and the accumulation of earth, sands, and clays. The first witnessed the action of fire; the second indicated the presence of the ocean, and the third demanded the movement of enormous glaciers with the formation of great lakes. 1901 Hitchcock

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Reality of the St. David's Channel.

The following considerations may aid us in the belief in the reality of the St. David's Channel: (1) The direct route is the natural course of the river, and for 1,000 feet the water still flows as in the former time. (2) The bend of the river at the whirlpool is phenomenal, nothing like it has yet been described among the numerous canyons of the Cordilleras. (3) The character of the material in the gorge is such as implies glacial transportation. At the end of the whirlpool about a hundred feet thickness of sand and clay are well exposed to view, underlying red till filling the whole gorge nearly forty feet higher than the flat surface of the limestone just at the outlet. This, till at the trestle over Bowman's Creek, holds considerable clay over a very stony mass. The creek clings to the west wall, not following the middle of the gorge, as commonly represented upon the Lake Survey maps. About one and a half miles northwesterly wells have been sunk a hundred feet in earth without reaching rock. Half a mile farther, two railroads have cut deeply through sand; and at the edge of the plateau are several cuttings and pits of gravel, certainly fifty feet deep. This modified drift may be a mile wide. It resembles an esker; and must represent the melting of a glacial tongue pushing from the main sheet up a notch in the edge of the plateau. The width of the gap in the rocky escarpment is about one and one-third miles. (4) The west wall of the canyon has been glaciated, for fully a half mile northerly from a point opposite the outlet. The smoothing and striation is upon both the Niagara and Clinton limestones, with a

1901
Hitchcock

southeast direction, corresponding to the course of the gorge itself, but differing fully seventy degrees from that observed upon the surface of the plateau. The same course has been noted at Thorold, and is quite common near the Dundas Valley; so that it is not necessarily a local deflection produced by the crowding of the ice through the St. David's Channel; it may result from the movement that blocked the Erigan gorge, though it seems better to refer it to the later epoch. (5) The depth of the Niagara River in the whirlpool and just below, in the lower gorge, are best explained by supposing the existence of an earlier St. David's Channel. The water is 150 feet deep in the whirlpool, is very shallow at the outlet, making a shelf there, while the normal great depth is renewed below. Deep excavations are made by a cataract; shallow ones, by rapids. When the river had worn back nearly to the whirlpool, there would be only a narrow rim separating the cataract from the ponded water above. The pressure of the water above would knock the wall down laterally, and thus there would have been no pounding of the lower layers by the cataract. If the wearing action had been effected by falling water continuously around the great bend, the depth would have been uniform, whereas now there is a shallow river. Hence, it is evident that the whirlpool pit existed before the origination of the lower gorge.

Granting the exercise of St. David's Channel the following events seem to have been necessitated: (1) A Niagara River, fully equal in dimensions to the present stream, flowed from the whirlpool to the edge of the escarpment near St. David's and thence to Lake Ontario. A cataract commenced at the cliff and cut its way back the entire distance of three miles. As intimated above, we can understand that sufficient water came down the Erigan river to accomplish this result; and, therefore, it is not necessary to say that the upper great lakes contributed their share, as now, to swell the stream; yet they may have done so. (2) Frigid conditions brought on a third ice sheet [Labrador] which pressed against the edge of the bluff, broadened the mouth of

the gorge, especially eroding the western wall because of the movement in a southwesterly direction, and filled the channel with till and modified drift, to the height of 300 feet. (3) The return of temperate conditions melted the ice and restored Niagara River, but it had not sufficient volume to overflow the barrier of till. Hence, it turned its direction to the northeast, following a slight depression in the plateau to the edge of the escarpment at Lewiston. After the stream had cut its way back to what remained of the original channel, the whirlpool was set in motion. 1901 Hitchcock

Erosion of the Lower Gorge.

There must have been some erosion in pre-glacial times along the lower part of this section, as is evidenced by the tributary canyons at the Devil's Hole and Smeaton Creek. What it amounted to in the main stream, no one can tell. The top of the cliff at Lewiston is about 575 feet, and the fall 325 feet. It would not have been well defined at first, because of the greater altitude of Lake Ontario and the character of the rock. The fall being over the Niagara limestone and shale directly into the level of the lake, would present a cataract 100 feet high, and could not act energetically upon the Clinton limestone beneath. Hence this becomes an upper fall, receding more rapidly than a second one, which would make its appearance as soon as the lake disappeared. For similar reasons this would wear away only the Clinton limestone and shale of 30 feet thickness. Thus there would be two cataracts, separated by a considerable interval. There remains the Medina sandstones and shales, which would have their own cataract, and so Niagara commenced the excavation of the lower gorge by a triple division of its energy. . . .

Two very important conclusions follow: First, the upper falls, receding more rapidly at first and more slowly afterwards, must have reached the island at Wintergreen flat before the lower cataracts caught up with it. Second, the falls being worn out

1901
Hitchcock

individually, the depth of the excavations must have been small. The profound depths of the upper great gorge are wholly wanting below the island. The width of the lower gorge is nearly as great as that above the railroad bridges, but the water is not very deep. Even if the whole volume of the present river was concerned in the erosion, the depth would be small.

Of the 330 feet exposed in the cliff at the mouth of the gorge, about 200 belong to the Medina terrane, and must have been the material over which the lower fall poured. This dips southerly, so that only 40 feet of it rise above the river at the whirlpool. While this fall receded slowly at first, its pace would be greatly quickened in passing southerly. The second fall must have receded uniformly, because the thickness of the Clinton is the same throughout. The upper limestone is twice as thick at the whirlpool as at Lewiston. So the upper fall could not recede so fast as at first, and the lower cataract gained constantly upon it.

Looking at the amount of water in the early Ontario, the Niagara must have fallen into it at a level 135 higher than it is now. This would have brought the level of the water to the top of the lower grey sandstone, or that just at the river's surface at the whirlpool. The lower fall, then, did not start so early as the others. But in a later epoch the lake receded so that its surface was over 80 feet lower than now. With the greater depth of fall the erosion of the lower rock would have proceeded more energetically. Perhaps the average recession has been the same as if there had been no variation in its rate. We do not consider in this sketch the excavation of the softer parts of the Medina terrane below Lewiston. Its presence neither accelerated nor retarded the excavation of the greater gorge.

A mile below the whirlpool there seems to have been an island in the midst of the channel analogous to Goat Island between the American and Canadian falls. Foster's flat shows a surface that was swept by the river before the excavation of the gorge. About fifteen feet below the level of the electric road at Winter-

green flat, is a rock terrace, 750 feet long, and 600 feet broad, which is believed to have been fashioned by the western part of the early Niagara; and at its northern end is a precipice over which the water fell into Foster's glen. The sloping area between the flat and the river, 2,500 feet long, and 750 feet wide, is covered by immense blocks of Niagara limestone. 1901 Hitchcock

History of the Great Lakes

From the statements now made of the history of the great lakes, there seems to have been two former possible outlets for the waters above St. Clair — by the Trent river and Lake Nipissing; and it has been suggested by Dr. Gilbert that, when the discharge was by the former route, the Niagara river cut its way through the shoals at Wintergreen flat; and that when the water flowed through the Nipissing channel, the gorge of the whirlpool rapids was excavated. . . . It is not easy to show just what part of the lower gorge was excavated when the upper lakes discharged through the Trent outlet. At the present writing, it may be best to say that, because of the limited time during which this discharge was effective, no marked effect was produced.

It is different with the Nipissing outlet. Mr. Taylor has shown that this discharge must have operated for a very long period. The Nipissing beach is recognized upon all the upper lakes, being the best defined of any of the ancient strands. . . . Fully eight-ninths of the water passed to the Ottawa River, leaving only one-ninth of the present volume for the Niagara. Consequently the gorge made by the Erie–Niagara must have been comparatively small. Its width at the top is 750 feet, and the depth of the river estimated at 35 feet. The descent is 45 feet, and the length three-fourths of a mile.

There is quite a contrast between these and the rapids above the cataract, which descend the same amount and have a similar length. The action is deliberate in the one, and impetuous in the other. The shallowness may result because of the want of erosive power in the smaller volume of water falling over the

1901
Hitchcock

cliff, or may be due in part to the superior hardness of the rock at the base of the falls, as suggested by Professor James Hall.

Some authors, following Pohlman, believe this part of the gorge was made by a smaller stream in pre-glacial times, perhaps in connection with the St. David's Channel, and before the modern Niagara came into being. This seems inadmissible, because the St. David's Channel evidently required a river of large volume for its excavation, greater than the Erie–Niagara, and the whirlpool rapids' gorge had a later origin. These facts also enforce the conclusion that it is not likely that in any case a small gorge would have been enlarged to the full width by the later greater volume of water. Were this true, this narrow section should show evidences of increasing enlargement during the latest episode of excavation. All agree that the river which excavated this section was of comparatively small size, and, consequently, that the duration of this episode must have been correspondingly great.

There is a shoal ledge between the whirlpool and Eddy basin not unlike the one between the whirlpool and cove, which was accounted for by supposing the presence of the water removed a rim of rock rapidly, without the aid of the cataract. Mr. Taylor suggests a species of weathering for its presence here. It is presumed that the St. David's Niagara eroded the gorge back to this ledge, when the work suddenly stopped. If the cliff were exposed to the elements for a time, the falling of talus blocks would ensue, with some weathering. Or the ice known to have moved through the buried gorge may have impinged against this ledge and fractured it. It must be remembered that, according to our views, this ledge was exposed for a very long time — while the whole of the gorge between the whirlpool and Lewiston was being excavated; so that the cliff could hardly fail to have been operated upon in some way. When the cataract commenced above the whirlpool, it would be occupied first with removing débris, and not in channelling out the bottom. These suggestions may show why that ledge remained shoal.

The Upper Section.

1901
Hitchcock

Between the falls and the railroad bridges, a distance of two and one-fourth miles, the interpretation of the history is easy. The gorge is uniformly of great width and depth, 1,300 feet in width and with the ordinary depth of 160 feet for the river. At the very cataract the bottom of the river is 100 feet lower than the level of Lake Ontario. The water moves slowly, falling about seven feet to the mile. The rocks vary but little in this section. All agree that the conditions determining the formation of this gorge are practically the same with those now prevailing; and, consequently, the only change in the scenery has been the position of the cataract. Having the same volume as now, the levels of all the upper lakes have not varied appreciably. Without doubt, during this episode, the falls have been viewed by the aborigines of our continent as they carried their canoes and cargoes from lake to lake.

The increase in the volume of water is supposed to have been occasioned by the rising of the land at North Bay; damming the water and compelling it to wear its channel through Lake St. Clair to Lake Erie. When the rush began, it bared many acres of rock on both sides of the river, leaving various denuded tracts, as the flat two miles in length, south of the steel arch bridge, on the Canadian side, and a very narrow strip on the American side, reaching as low as to the whirlpool, give evidence. These flats are like the bed of Niagara above the rapids, if the water were removed and vegetation had gained a footing. Because of the presence of these old river beds where the Johnson ridge crosses the gorge, it seems to us that it furnishes no obstacle to the free passage of the water. This ridge is an anticlinal swelling in the strata, but had been broken down by early erosion, so that really no greater mass of limestone has been excavated here than elsewhere in this section.

Goat Island rose higher than the water on either side, and, therefore, dividing the stream into unequal portions. Its former

1901
Hitchcock

extension northerly may be indicated by the promontory directly opposite the north end of the American fall, utilized as a pier for the landing of the Maid of the Mist, for there is a rescission in the cliff just behind. It would seem that the former northerly extent of the island crowded the Canadian fall so that it was compelled to excavate a place for itself, and cut into the wall back of the promontory.

The occurrence of fluviatile shells in various places along the banks illustrates another phase in this history; the presence of water, sometimes thirty feet above the present level. The highest locality observed is at the Bowen place, three miles above the falls. Next, they are well shown in the recent excavations for the new wheel-pit of the Cataract Construction Company. The opening shows two feet of clay and sand at the surface, overlying a thicker sandy mass containing *Cyclas*, *Goniobaiss*, *Unio* and *Planorbis* in considerable abundance. At the base of the earthy material is a mass of till ten feet thick, resting upon the glaciated surface of the Niagara limestone. The locality upon Goat Island has been studied by Lyell and Hall. In a gravel pit now being excavated these same shells occur plentifully; some of the *Unios* and *Cyclas* still having their valves closed. This deposit is fully twenty-five feet thick, mostly of coarse gravel, readily correlated with corresponding beds in the villages upon both sides of the river. At Clifton sixteen species have been found, adding to the above the genera *Physa*, *Limnoea*, *Paludina*, *Amnicola*, *Margaritana* and *Pisidium*. Other localities are just below the railroad bridges on the west side, and on both sides of the whirlpool. Their surface altitudes vary from 566 to 575 feet above the sea. Professor Hall says that the pebbles upon Goat Island have been transported northerly, as they contain fragments of the Black Rock limestone at Buffalo. He thinks the action was fluviatile, the first condition having been that of a quiet lake, followed by quite a strong current. Hence, the correlation is with the lake covering this region after the deposition of the Lundy beach.

Recession of the Cataract.

1901
Hitchcock

Everyone has heard how the cataract recedes and the gorge elongates. The water pours over a cliff of hard limestone, from 140 to 170 feet deep, and pounds upon the soft rocks beneath. As these give way, the higher, harder strata project like cornices, and when they have assumed considerable prominence, being unsupported they fall down. As seen from Horseshoe Fall, erosion is more effective in the center of the current. The stream rushes more and more furiously into the middle, and tends to abstract some water from the sides — perhaps leaving large surfaces of rock bare. The undermining of the cliffs cause these "table-rocks" to fall, eventually, and thus the width of the gorge is kept essentially uniform; and in the long run, the breadth keeps pace with the extreme points of erosion.

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The piles of talus upon both flanks of the gorge throughout its seven miles of extent, testify to the wide extent and constancy of this movement. The fragments at the base of the cataract will be broken quite rapidly, as nothing can resist the force of the fall. The depth of the water here is greater below the level of the stream than the height of the rock above. The limestone is from 60 to 80 feet thick; the shale, 82; the Clinton limestone, 30 feet. Beneath the water level there may be 200 feet of the Medina terrane.

By comparing the best views of the falls taken at different dates, it is very easy to note the fact of recession. Precision has been given to the rate by careful measurements, with the most delicate instruments, of the positions of every part of the cataracts at stated intervals. It is usual to compare the positions determined trigonometrically by Prof. Hall in 1842, and in 1890 by Engineer A. S. Kibbe. During this period of 48 years, about 220 feet in length of the limestone has been removed, or about 4½ feet each year. This means that the gorge is lengthened by this amount each year. Although the uppermost part of the

1901
Hitchcock

fall is narrow, the gorge will broaden as fast as the apex recedes, as explained above; and therefore it is reasonable to use the rate of recession of the fall as equivalent to the average of elongation of the gorge. Here and there the gorge may widen or contract, according to variations in the volume of the water, its velocity, the width of the channels, the thickness of the limestones and other rocks, their comparative hardness, etc. It is not our purpose to present allowances for these varied conditions, as the approximate estimate derived from the rate of recession will indicate how the calculations should be made.

Estimates of Age in Years.

Let us assume the present rate of recession to be four feet annually. This is less than what has been observed, but some think that the time for the wearing action must have been greater, and the omission of the half foot may be nearer the true figure. There is a greater thickness of limestone at the Johnson ridge than elsewhere, in the first section of the gorge, from the falls to near the railroad bridges, and possibly more time would be required for its erosion. But it seems as if this excess of thickness was removed in pre-glacial times, because the flat produced by the ancient bed of the river, before the erosion of the rock had been effected, slopes uniformly, without regard to the presence of the ridge. Hence this excess of rock has not materially affected the rate of erosion here. The total length of this first section of the gorge is 11,750 feet. This measurement was made in 1875, and the gorge must now be over 100 feet longer, making the entire length 11,850 feet. Divide this by four, the number of feet the cataract recedes annually, and the quotient is 2,962; i. e., the beginning of the great cataract dates back to 1062 B. C., 300 years before the time of Romulus, or to the reign of King David at Jerusalem.

The next section is that of the whirlpool rapids, 3,900 feet. If the water of Niagara came from Lake Erie alone, under

existing conditions, its volume would have been three-fourteenths of the present flow. This is less than the volume of the water pouring over the American fall, which recedes 0.64 of a foot annually. This stream may be conceived to wear away the rock at the rate of six inches annually. If so, it would have required 7,800 years for the formation of the gorge of the whirlpool rapids. 1901 Hitchcock

The Eddy basin seems to have been worn by the normal Niagara. With the same rate as has been given for the first section, only 375 years would be required to erode this distance of 1,500 feet. The whirlpool belongs to the St. David's epoch, and will be considered in another connection.

The Cove section, or the part from the whirlpool to the narrows at Foster's Island, is 3,750 feet long. No one imagines the rate of the recession for this section to be different from that first named, as the width of the gorge and the depth of the water are the same. This would have required 937 years for its excavation.

Professor Spencer has calculated the age of the lower section of the gorge from Lewiston to Foster's Island to be 17,200 years, upon the assumption that the conditions would be those of the American falls. But measurements of the breadth below the Cove section give an average of width of the top of the gorge, fully equal to that of the upper gorge as far as to the Catholic College, 5,754 feet, while the other part, 8,448 feet, may for convenience be comparable to the American falls. Calculations upon these bases give 1,438 years for the upper part, and 5,406 years for the lower, a total of 6,844 years.

The section from the beginning of the whirlpool to the edge of the escarpment, near St. David's, is about three miles in length. Its erosion was effected before the last ice-epoch, according to our interpretation, and some might say pre-glacial. It would appear that the volume of the water passing through was fully equal to that of the present epoch, and may have been derived from the same sources. At the rate of recession adopted

1901
Hitchcock

for the greater gorge, the time must have been at least 3,960 years. This does not account for the greater width of the mouth of the gorge, which may have been either waterworn, or eroded by the ice-sheet.

The sum of the figures given above amounts to 18,918 years for the present gorge, to which might be added the figure for the St. David's channel — making in all 22,878 years.

Professor Spencer's estimate of the age, including the whirlpool, but not the St. David's channel, sums up 31,000 years, to which he adds a thousand years for the duration of the river before the advent of the falls. Sir Charles Lyell gave the figure of 36,000; Professor Warren Upham, 10,000, and F. B. Taylor would estimate it to lie between 36,000 and 50,000.

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Principal Events in the Niagara District.

It may be useful to summarize the various episodes in the geological history of the region of Niagara, as now delineated. In the not distant future, geologists may be able to give them value in centuries or years.

1. Laying down of the crystalline Archean floor, upon which Cambrian and Lower Silurian terranes were deposited in order, before the dry land reached as far south as Lake Ontario.

2. Deposition of the Upper Silurian members of the series: (a) Medina clays and sands resting upon the raised Lower Silurian land, and extending from Lake Ontario to some distance south of the falls. (b) Clinton shale and limestone. (c) Niagara shale and limestone, both formed below the ocean's surface; coral reefs extensive. (d) Onondaga, or Salina, salt group.

3. Land gradually rising and attaining a considerable altitude at the close of the Paleozoic era. Subaerial denudation continued through later periods, during which time the basin of Ontario takes shape.

4. Age of Erigan River. Drainage of country from the

Appalachian coal fields northerly, discharging through the Dundas Valley into Lake Ontario. 1901 Hitchcock

5. First ice age, that of the Cordilleras. Not certain that its influence was felt in the Niagara region.

6. Second ice age, the Keewatin. Blocking up of Erigan River. Ice moves southerly; its melting gives birth to Lake Erie.

7. Temperate epoch. Wearing of the gorge through the St. David's channel, including the whirlpool, 3,960 years.

8. Accumulation of ice upon the Labrador highlands and its movement southwesterly, as far south as to the Ohio River, filling the St. David's Channel. Terminal moraines left as it recedes; one near Buffalo, and the next from Lockport across to Toronto.

9. Warren Lake, discharging at Chicago, occupying parts of Lakes Michigan, Huron and Erie.

10. Algonquin Lake was composed of Lakes Superior, Michigan and Huron, discharging into the Ontario basin through Lake Erie, or by way of Balsam Lake and Trent River, and thence through the Mohawk into Hudson River. . . .

11. Iroquois Lake, as expanse of Lake Ontario succeeded, discharging through the Mohawk. Beginning of the erosion of the lower gorge. River divided by the island below Wintergreen flat. Time of erosion 6,844 years.

12. Erosion of the Cove section requiring a river as large as the present Niagara. Breaking of the barrier at outlet of whirlpool. Time, 937 years.

13. Period of erosion of the gorge of the whirlpool rapids, when the water of Lake Erie alone was concerned. Outlet of upper lakes perhaps through Lake Nipissing. Time, 7,800 years.

14. Restoration of full volume of Niagara River. Upper great gorge excavated from the railroad bridges to the existing cataract. Time, 2,962 years.

Time since the water fell over the Niagara escarpment, 18,918 years. Between this epoch and the shifting of the Labrador ice-sheet from the Niagara River valley there intervened Lakes Warren and Algonquin (events 9 and 10), probably not

1901 Hitchcock

of long duration. Nothing about Niagara gives us any clue to the duration of the Labrador ice-sheet. The time of the wearing of the whirlpool basin, 475 years, is not included in the estimate of the age of the general gorge.

HITCHCOCK, CHARLES H. Story of Niagara. (Am. antiq., Jan. and Feb., 1901. 23:1–24.)

1901 Letson

LETSON, ELIZABETH J. Post-pliocene fossils of the Niagara river gravels. (Bull. of the N. Y. state museum. No. 45. 9:238–252.)

1902

1902 Wright

WRIGHT, GEORGE FREDERICK. The rate of lateral erosion at Niagara. (Am. geol., March, 1902. 29:140–143.)

Definite results of observations made in 1899 to determine the rate of lateral erosion at Niagara. The investigations were undertaken at the commission of the New York Central R. R. after the publication of the author's article on "Lateral Erosion" in the Popular Science Monthly for June, 1899.

1903

1903 Clarke

CLARKE, JOHN M. Scientist's view of Niagara. (Harp. w., Nov. 21, 1903. 47 (part 2):1866.)

The New York State Paleontologist foretells the death of Niagara Falls from natural causes 3,500 years hence. He thinks that the escarpment will be left dry "at a point not very far south of Goat Island with a height of one hundred feet."

1903 Upham

UPHAM, WARREN. The past and future of Niagara Falls. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: 1903. 19:229–254.)

The greater part of this paper was first published in The American Geologist for October, 1901, volume 28, pp. 235–244, to which were added introductory paragraphs and the discussion of the future changes of Niagara lakes. The author estimates the time required for the erosion of the gorge as about 7,000 years, considerably less than the estimate of many geologists who preceeded him.

The chief interest of geologists in their studies of the Niagara gorge and falls, which have been set forth in many essays, published mostly within the last fifteen years, arises from the fact, admitted by all, that the gorge erosion began at the end of the

Ice age and has ever since been in progress, and from computations or estimates of the duration of that period, obtained by comparing the length and other dimensions and features of the gorge with the present rates of its erosion by the falls and its widening by decay. and the wear of rain and frost upon its inclosing cliffs. And the chief reasons for wishing to determine, approximately, the length of the Postglacial period consists in its application as a key to unlock the difficult problem of the age of the earth. Geology knows ratios of the relative lengths of its periods and eras, which, if the length of this latest period can be learned, will supply the approximate duration of all the geologic ages. 1903 Upham

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In the careful studies of the history of the Niagara river and gorge by Pohlman and Gilbert, as in the earlier observations of Lyell and Hall, the coincidence of the postglacial Niagara gorge with the preglacial St. David's channel at the whirlpool is clearly recognized. The present river here has washed out the drift that filled the ancient channel and apparently reached to the bottom of the whirlpool, about 130 feet above the sea. Thence the preglacial St. David's stream bed, beneath the drift, has probably this depth of 117 feet below the level of Lake Ontario, or more, along its course past St. David's and onward to the deep central part of the Lake Ontario basin.

The preglacial stream, as Pohlman has shown, drained the shallow Tonawanda valley, but not the area of Lake Erie. At the whirlpool this St. David's stream, according to Pohlman, plunged down in a cataract from the hard Medina sandstone bed, which is underlain and overlain by soft shales. Having at this place eroded a valley or ravine 400 feet deep beyond the Medina falls and a quarter of a mile wide, this stream doubtless also had cut an important ravine, though of smaller size, along its higher course for a considerable distance before reaching the site of the whirlpool. Dr. Pohlman supposes, with sufficient reasons, that the St. David's ravine reached along the part of the

1903
Upham

Niagara gorge occupied by the whirlpool rapids, having a middle vertical fall over the Clinton limestone and terminating at an upper vertical fall over the Niagara limestone, above which, in its approach from the south, the stream was only a little lower than the adjoining country.

Some of the latest contributions to the geologic literature of Niagara, by Taylor, Hitchcock, and Gilbert, assign to the St. David's channel an interglacial age, and regard it as the course of a great river, an interglacial Niagara, which was allowed the time requisite for the erosion of a gorge about three and a half miles long, from the escarpment near St. David's to the south side of the whirlpool, but was then interrupted by the accumulation of ice again deeply enveloping all this region. This explanation, however, seems to me inadmissible, because the St. David's channel expands northward to the width of more than a mile before it intersects the escarpment. If it had been cut by a great interglacial cataract, its width would be nearly uniform, like the present river gorge. A comparatively small stream, on the contrary, working slowly through many million years, would have the older part of the valley thus widened by the very long subaerial decay and retreat of its rock cliffs on each side. So great lateral erosion cannot be ascribed to glaciation, which was light upon this area of confluent ice currents from the northeast and northwest, with consequent deep drift deposition.

Immediately after the melting of this southern part of the ice-sheet and the withdrawal of the ice-dammed Lake Warren, the Niagara river began to erode its gorge, and it has continued in this work, under varying conditions, to the present time. It found a lower passage along the course of the gorge to Lewiston than in the course of the preglacial channel, deeply drift-covered, between the whirlpool and St. David's. From my renewed examination of these areas a year ago, with the aid of the contoured map distributed by the United States Geological Survey at the Pan-American Exposition, of the latest studies by Gilbert, published on the reverse side of the map, and the valuable

"Guide to the Geology and Paleontology of Niagara Falls and Vicinity," prepared by Grabau, summarizing the conclusions of all preceding geologists, for the many visitors who came to the exposition and to Niagara during last year, I have to add to these and to my own former studies another factor in the Niagara history, namely, that the erosion of the gorge below the whirlpool had been partly accomplished by a small preglacial stream, which flowed along nearly the entire length of that earliest part of the gorge, after draining at its head farther east probably nearly the same area as the present Fish creek. Joining the St. David's channel at the whirlpool, this eastern tributary undoubtedly had cut a deep ravine, with falls and cascades, along its last mile or more. At the east end of the Foster flats and farther upstream, the preglacial Fish creek had merely a very shallow valley, slightly hollowing but not trenching the bed rocks. 1903 Upham

Under this view we see readily how the Niagara river withdrew its waters from the low cataract at the Foster flats. On reaching the head of the preglacial ravine in the gradual recession of the falls, the main current, which passed on the southeast side of the flats, speedily eroded a deeper channel, far below its former bed above that cataract, because the drift filling the old ravine was easily swept away. Along a distance of nearly two miles, adjoining the Foster flats and northeasterly, the river flowed afterward in powerful rapids, eroding this part of the gorge into the rock strata to its present depth; and the greater depth, with slow and smooth current, for a half a mile between the flats and the whirlpool may be due to such deep erosion by the preglacial stream there, its ravine having been cut down nearly to the bottom of the St. David's channel before coming to their junction.

Evidently the preglacial brook that coincided somewhat nearly with the present Fish creek could not have passed northward through the Niagara escarpment in the course of the river gorge. The crest of the escarpment there is higher than the land stretching south and southwest to the whirlpool. The gorge has no widening, such as is a most remarkable feature of the old

1903
Upham

channel at St. David's, where it approaches and cuts the escarpment; nor does it show evidence of much greater age there, as geologists count time, than along any other part, even near the present cataract. Professor G. F. Wright has proved, instead, that the oldest part of the gorge, at and near the escarpment, can have endured the inevitable weathering of its cliffs no longer than 10,000 years, and that indeed its age, which is also the entire age of the Niagara river and falls, may be a considerably shorter period.

It seems very clear to my mind that the gorge erosion above the whirlpool was much aided by the preglacial St. David's stream for the distance of one mile occupied by the great rapids. Here the major part of the depth and width of the gorge had probably been already eroded before the Ice age, being then filled with drift, which the postglacial river easily removed as soon as its gorge toward Lewiston was sufficiently deepened. No powerful falls have there cut a deep channel, and the river consequently has a restricted and very rapid course. Above the old St. David's ravine, however, a massive waterfall has operated along the latest distance of nearly two miles of the gorge, giving to the river there its great depth.

The action of a high waterfall, with great volume of water, precipitated over a hard rock stratum, of which large blocks give way and fall because they are gradually undermined, as in the Horseshoe falls, is well compared by McGee to the deep wearing of potholes. The fallen blocks are moved under the powerful impact of the high cataract and wear a deep channel, attaining near the foot of the present falls the depth of almost 200 feet under the river level. Such cataract action of deep channel wearing may be supposed also to have produced the great depth of the Niagara river at the mouth of the gorge; but I think that this is better attributed to the usual process of stream cutting at the time of depressed level of this part of Lake Ontario, which is otherwise known by its lower inclined beaches extending here under the lake.

Among the conditions which might cause the Niagara river to vary from its present size, only one would produce a great and long continued diminution of the river, so giving for a large part of its history only very slow erosion of the gorge. This hypothetical factor in our problem, which has been assumed by Gilbert, Spencer, Taylor, and Hitchcock, to considerably prolong the time of the gorge erosion, is the diversion of the outflow from the basins of the three lakes above Lake Erie, then confluent and forming the glacial Lake Algonquin, to forsake its present course and pass eastward from Georgian Bay, at first by the way of Lake Simcoe and the Trent river to Lake Ontario, and later by Lake Nipissing and the Mattawa river to the Ottawa. 1903 Upham

But differential elevation of the land from its late glacial or Champlain depression here, as on the area of Lake Agassiz, which is now drained by the Red River of the North to Lake Winnipeg and thence by the Nelson river to Hudson bay, took place as soon as the land was unburdened by the glacial retreat. This northward uplift was in progress while yet the ice barrier remained farther north and northeast, holding in succession the glacial lakes Warren and Algonquin, besides several earlier and smaller glacial lakes which became merged in Lake Warren, on the upper part of the St. Lawrence river basin. In the areas of Lake Agassiz and of the Laurentian lakes alike, the uplift was nearly completed during the existence of the glacial lakes, as is known by the almost undisturbed horizontality of the latest and lowest glacial lake beaches. Finally Lake Algonquin, by the northeastward land elevation, became divided into its successors, Lakes Huron, Michigan and Superior.

Instead of the hypothesis of a long continued eastward outflow from Lake Algonquin, my studies convince me that the Trent and Mattawa outlets were occupied successively during only a brief time, or, more probably, that these outlets were obstructed by the receding ice-front until after the land there had risen from its Champlain depression to such altitude that the St. Clair and Detroit rivers continued to be constantly the outlet

1903
Upham

from the upper lake basins, sending their waters to the Niagara river and falls during all their history.

Lakes Algonquin and Iroquois were contemporaneous, and the Ontario basin inclosing Lake Iroquois was at the same time uplifted toward the northeast, with inclination of its earlier shorelines, and with gradual rise of the lake on the land westward because its outlet at Rome was raised much more than the western part of the basin. While these two glacial lakes were undergoing such changes, a lobe of the mainly retreating but wavering ice-sheet lingered on the highlands north of Lake Ontario; and twice its moderate readvance was recorded by deposits of till intercalated with the stratified beds of a lacustrine delta, in the extensive section of Scarboro Heights near Toronto. The uplift of the Iroquois basin, as well as that of the Algonquin basin, is thus shown to have been far advanced and nearly completed during the continuance of their ice barriers.

Latest, the glacial Lake St. Lawrence, held by the final blockade of the waning ice-sheet on the St. Lawrence valley below Montreal, extended into the Ontario basin with a depth of about 150 feet above the Thousand Islands, but with its water level beneath the present surface of the west part of this lake. In like manner with the earlier Lake Iroquois, the progressing northeastward uplift caused the level of the Lake St. Lawrence and afterward of Lake Ontario to rise upon the land in the southwest part of the Ontario basin. It was during these late stages of the lacustrine history of this region that the deep channel of the Niagara river at the mouth of its gorge was eroded, the channel being subsequently partially refilled with water by the continuance of the northeastward land elevation. The river from Lewiston north to its mouth has a depth of 100 to 200 feet, which indicates almost as much rise of this part of Lake Ontario, for no high waterfall existed to erode the very deep channel there.

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But there are, as this discussion has also before noted, ample reasons for distrusting the arguments and computations of Spencer

and others concerning eastward outlets from the upper lakes, subtracting their flow from the Niagara river, which, as I believe, are untenable, or at the most, had only a very short existence. Omitting that element of the problem as insignificant, we have approximately 7,000 years, according to diverse but concurrent computations, for the probable time occupied in the erosion of the gorge. 1903 Upham

Not satisfied with rejecting the hypothesis of long and great subtraction from the water supply at Niagara, I wish to direct attention to a very important cause of great increase of size of the river and falls at the beginning of the gorge erosion. The discharge of the river during the last 1,000 years may be approximately represented by 1,200 or 1,500 feet of water covering all the upper St. Lawrence drainage basin above these falls. This average water supply I believe to have been doubled or trebled during the first 1,000 years of the river history by the added flow derived from the final melting of the ice-sheet, mostly 3,000 to 5,000 feet or more in thickness, upon a very large region stretching from Lakes Huron and Superior far north and northwest. For some part of this time the Niagara river probably received the outflow from the basin of the glacial Lake Agassiz, that is, the vast central tract of Canada between James Bay and the Rocky Mountains. Within its first 1,000 years, therefore, the more powerful Niagara may have accomplished about half of its gorge erosion between Lewiston and the whirlpool. When the river was reduced to its present size, after its tributary ice-melting ceased, 2,000 years were probably adequate for the completion of the gorge to the whirlpool, the work having been greatly lessened by preglacial erosion; similarly, on account of the old St. David's ravine, 1,000 years, or less, would suffice for the erosion along the whirlpool rapids; and, under the present conditions of gorge cutting, 3,000 years were required for the last two miles. The whole history would thus comprise about 7,000 years.

This measure, which (not to be too exact in figures depending

1903
Upham

on the varying conditions of the Niagara history) we may place in round numbers as between 5,000 and 10,000 years, is at the same time the duration of the period since the end of the Ice age, or, speaking more definitely, since the retreat of the continental glacier from the northern United States and Canada. It may be so accepted with confidence, for it agrees with the estimates and computations independently made for the same period by Prof. N. H. Winchell, from the recession of the Falls of St. Anthony; by Andrews, and recently also by Leverett, from the shore erosion of Lake Michigan and the accumulation of sand at its south end; by Wright, from the filling of depressions among kames and eskers, and from erosion by streams tributary to Lake Erie; and by Prof. B. K. Emerson, from postglacial deposition in the valley of the Connecticut river. In Europe, likewise, numerous estimates of the lapse of time since the glacial period, as collated by Hansen, are found to be comprised between the limits of 5,000 and 12,000 years, being thus well harmonious with the measure given us by Niagara Falls.

In accordance with the ratios of the relative duration of preceding geological periods and eras, having found the approximate measure of the latest term in the series, namely this postglacial period, as about 7,000 years, we may well estimate the whole Quaternary era, including the Ice age, as about twenty times longer, giving to this era some 150,000 years. . . .

With the past labor of Niagara Falls thus reviewed, showing the river at its unfinished task, our investigation is led forward to inquiries concerning the future. Here the popular mind, impressed by the power of the cataract, and disturbed by predictions of its changes and their results, however remote as measured by centuries and thousands of years, has suffered much foreboding. Without full or clear understanding of the dreaded results, the common people have said, like the poet Burns,

> " Forward, though I canna see,
> I guess and fear."

1903
Upham

The earliest discussions of the recession of the falls led to apprehension of danger and disaster, because the continuance of the present gorge erosion must eventually extend to Lake Erie, the reservoir whence the river flows. It was thought, therefore, in the excited imagination of many ignorant readers, when the early geological discussions of the history of Niagara were published, that a destructive flood would thus be let loose from Erie and the upper lakes to deluge the Ontario basin and the St. Lawrence valley. Professor James Hall, in 1843, endeavored to allay these fears. The increasing southward dip of the rock strata between the present falls and Lake Erie will cause the Niagara to cut into softer and easily eroded beds along that distance, so that its great cataract, which depends on the thick and hard Niagara limestone overlying soft shale, can be no longer maintained. The river will then run, as Hall declared, in a series of rapids along all its course from Lake Erie to Lewiston, with perhaps a low fall at the outlet of the lake. He further wrote: "The views which have been entertained of the sudden drainage of this or any of the upper lakes, and a deluging of the country on the north and east, are no longer considered as tenable by any one; and even if Lake Erie could be drained suddenly, it would cause no deluge of any importance."

More recently another anxiety has been raised by computations of a probable tilting of the land, slightly changing its inclination on all the region of these great lakes, so that ultimately the mouth of Lake Erie would be lifted higher than the very low water divide close southwest of Chicago. The Niagara cataract would then be left dry, and the outflow of all the lake basins above Ontario would pass, as during the existence of the glacial Lake Warren, to the Des Plaines, Illinois, and Mississippi rivers. Spencer, in 1894, computed that the land tilting will thus divert the drainage about 5,000 or 6,000 years hence, and that this will take place before the gorge erosion will reach Lake Erie.

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1903
Upham

If all these changes should take place, however, there can be no doubt that the harbors and waterways, including canals, which now receive the vast and growing commerce of Buffalo, Cleveland, Toledo, Detroit, Chicago, Milwaukee, Duluth and Superior, and many other cities and towns on these lakes, will still be maintained in full utility. For the largest city of this area, Chicago, although it is mainly built on land only a little above the level of Lake Michigan, we may be confident that no inundation will ensue. A drainage canal leading to the Des Plaines and Illinois rivers has been cut down below the lake level, and it needs only enlargement to carry the whole outflow of these lakes, and to preserve the water level at Chicago unchanged by the land movement.

The present very slow tilting of this region is a continuation of a great and far extended differential uplift which has taken place during late glacial and postglacial time. The vast country that had been ice-covered and depressed under the weight of the thick continental ice-sheet was gradually uplifted, and to a greater height at the north than at the south, during the removal of the ice burden. While lakes Agassiz and Warren still existed, the northern parts of this area were raised, in comparison with their southern outlets, 300 to 400 feet or more. It is also found by the present inclinations and relationship of the successively formed shorelines of these and the other associated glacial lakes, that this movement proceeded as a permanent wave of land elevation from the periphery of the old ice-sheet inward to its central area.

Both North America and Europe have experienced great differential movements during and since the Ice age. From their high preglacial elevation, the ice-enveloped lands sank beneath the weight added by the snows of many thousand years; and the warmer climate thereby produced on the boundaries of the ice-sheets caused them to melt away, their latest remnants being on the central areas where the ice accumulation was thickest. The sea then overspread the borders of the depressed lands. In

the St. Lawrence and Ottawa valleys, and in the basin of Lake Champlain, fossiliferous marine beds overlie the glacial drift, whence the name Champlain epoch has been given to this final part of the glacial period. Closely attending and following the retreat of the melting ice border, a general re-elevation, varied in some regions by oscillations of uplift, ensuing depression, and renewed uplift, has brought the glaciated areas to their present altitude, which is probably now nearly steady and permanent for the greater portions of these areas. 1903 Upham

The basin of Hudson Bay, in the central part of the glaciated area of North America, is ascertained by Dr. Robert Bell's observations to be now slowly rising, mainly at the rate of a few feet in a century; but perhaps this uplift has ceased, as Mr. J. B. Tyrrell thinks, in the vicinity of the mouths of the Nelson and Hayes rivers, on the southwest coast of the bay. On our Atlantic coast, from Boston to Cape Breton Island, where the re-elevation from the Champlain depression ranged upward to a maximum of about 300 feet in Maine, an ensuing subsidence of the land, that is, a movement of opposite direction, has lately taken place and is probably still very slowly in progress, its maximum amount near the head of the Bay of Fundy being apparently at least 80 feet. In Southern Sweden the Champlain depression was succeeded during the retreat of the ice-sheet by re-elevation of the land somewhat above its present height; next it was again depressed, but less than before; and from this second depression it is now slowly rising at a maximum of two or three feet in a hundred years.

These notes of the continuance of the great Quaternary movements of the continental areas which suffered glaciation are presented for the purpose of directing attention to their inconstancy, oscillations, and reversals. From the consideration of these well ascertained continental changes, it seems to me that the evidence of very slight tilting of the Laurentian lakes region now taking place, as made known by surveys of precise leveling which give comparisons between dates less than forty years apart, should

1903 Upham not be regarded as an important basis for predictions of changes of the course of drainage from these Laurentian lakes, turning their outflow away from the Niagara river to the old glacial Chicago outlet 2,000 to 3,000 years hence.

1904

1904 Pohlman POHLMAN, JULIUS. Niagara Falls. (*In* Encyclopedia Americana. Ed. by F. C. Beach & others. Americana Co. N. Y.: 1904. Vol. II.)

This model encyclopedic article gives a simple account of the geology of Niagara Falls without exploiting prominently the views of the author. There is a discussion of the preglacial drainage and the recession of the Falls. The figures for the depth of the river and Falls are now out of date. For the preglacial period the article adopts the theory of the discharge through St. David's channel and three falls beginning at the whirlpool. The article is elucidated by diagrams, and there is a view of the Falls in winter showing the ice-mound below the American Fall.

1905

1905 Adams ADAMS, ALTON D. Recession of Niagara Falls. (Sci. Am., Sept. 2, 1905. 93:178.)

A sketch of the historical and geological arguments and of the effects of the recession.

1905 Spencer SPENCER, JOSEPH WILLIAM WINTHROP. [Report on] Niagara falls and Niagara district. (Can. geol. survey. Summary report. 1905. Pp. 87–91.)

A review of the previous Niagara surveys and reports of Spencer and others, with an account of the resurvey made by Spencer in 1905 giving a résumé of the recessions of the Falls since his earliest reports, and his soundings in the gorge, with a synopsis of the full report to be issued later.

1905 Upham UPHAM, WARREN. Geological history of the Great Lakes and Niagara Falls. (Internatl. q., July, 1905. 11:248–265.)

A history of the glacial lakes, Niagara Falls as a chronometer, the future of Niagara and the Upper Lakes, and the dangers of diversion.

1906

1906 Recession of Niagara Falls. (Sci. Am. sup., Sept. 8, 1906. 62:25651–25652.)

1907

CORNISH, VAUGHAN. The travels of Ellen Cornish: being the memoir of a pilgrim of science, with sixty-five plates from photographs by the author, maps and plans. Lond.: W. J. Ham-Smith. 1913. Pp. 105–138.) **1907** Cornish

The author and his wife spent three weeks at Niagara in 1907. In the account of their visit, there is given a full and complete description of the Falls from all points of view with special attention paid to the physical phenomena of the cataract, viz: the channel, its depth, width, etc., and the formation of the whirlpool and lower rapids. There is a description of the " standing waves " above the cataract, as well as of the steady and continuous motion of the water at the foot of the fall. There is a reference to Captain Basil Hall's theory of the effect of surface friction of the air on these masses of water. An account is given of the trip on the Maid of the Mist. In the description of the rapids and gorge close attention is given to all details of the water effects, the color, formation, currents, etc.

G. A. G. C. Erosion at Niagara; [Review of Gilbert's " Recession of Niagara Falls " and Report of Carvel Hall in Bull. U. S. geol. surv. No. 306. 1907.] (Nature. 1907. 75:607.) **1907** G. A. G. C.

GILBERT, GROVE KARL. Rate of recession of Niagara Falls. Accompanied by a *Report of survey of crest line of Niagara Falls*, by W. Carvel Hall. U. S. Geol. survey, Bull. 306. 1907. (Ann. rep'ts of the com'rs of the state reserv. at Niagara. Albany: J. B. Lyon. 1907. 23:39–73.) **1907** Gilbert

A discussion of data for estimating recession and the reasons for discrepancy among the various data. Contains maps, views and diagrams.

INTRODUCTION.

The erosive work of the cataract of Niagara is exceptionally rapid. This depends primarily on the great power of the falling water, but in part on the character of the local geologic structure. The rocks are stratified and lie nearly level. The upper layers are of limestone, strong and resistant; the lower, consisting chiefly of shale, are comparatively weak and yielding. As the shales are worn away below the limestone beds are undermined, so that their edges project like a cornice and are deprived of support. From time to time they yield to the force of their own

1907
Gilbert

weight and fall away in large blocks. Each rock fall causes a jar of the ground which is perceived by people in the vicinity, and results in a modification of the crest of the cataract which is readily seen by anyone familiar with its outline. Such changes of the crest have been observed from time to time ever since the neighboring banks of the river were occupied by white men. It is highly probable that they were also observed by Indians before the advent of white men, but on this point I have made no inquiries, as Indian traditions are not likely to be sufficiently definite to aid in determining the rate of progressive change in the position of the cataract.

The surface of Lake Erie is 325 feet higher than the surface of Lake Ontario. The belt of land between them includes two plains, of which the higher and broader is raised but little above the level of Lake Erie, and the lower slopes gently to the shore of Lake Ontario. The descent from the upper to the lower is abrupt, constituting a line of cliffs parallel to the shore of Ontario and known as the Niagara escarpment. The river, issuing from Lake Erie at Buffalo, flows at first on the upper plain. It is there broad and comparatively shallow and has no valley. At the falls it suddenly drops into the head of a narrow gorge which is six miles long and extends to the escarpment. Within the gorge it is narrow and contained by steep walls. Near the head of the gorge the water is deep, the current moderate, and the descent small, but farther on are fierce rapids with steep descent. Some of these relations are shown in fig. 2. As the falls are at the head of the gorge, it is evident that their recession makes the gorge longer.

(Here follow citations from various authors who had observed the recession of the Falls, beginning with McCauslin in 1774–1783.)

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The preceding citations serve to show the early development of three ideas: (1) That the crest of the Horseshoe Fall is receding upstream, the recession being caused by the energy of the

cataract; (2) that the gorge before the falls was created by this process of recession, the position of the falls having originally been where the mouth of the gorge now is, and (3) that it is possible, by sufficiently accurate observations, to determine the rate at which the change is taking place. 1907 Gilbert

Associated with the idea of measuring the rate of recession was that of applying it to the determination of the time consumed by the river in the making of the gorge. By some of the earlier writers the age of the gorge was obscurely connected with the age of the world as estimated from Biblical data; by others it was recognized as a small fraction of geologic time. With the progress of knowledge of the local geologic history there was increasing interest in the time estimates for the river, and the various conditions affecting the estimate came to be scrutinized with much care. As developed by careful study, the problem proved to be complex and difficult. It came to be recognized not only that the rate of recession in different parts of the gorge must have varied with the height of the cataract, the temporary width of the stream, and the thickness of the capping limestone, which is different in different places, but also in a very important way with the volume of water carried by the river, which has been subject to extreme fluctuations. The influence of these various conditions assumed prominence in the discussion, and altho the rate of present recession came to be fairly well known, opinions still differed widely as to the total period represented by the gorge. The age of the gorge is outside the scope of the present paper, and the subject is here mentioned only to show the basis of the strong interest which has been felt in the determination of the present rate of recession.

In 1841 James Hall, then geologist of the fourth district of New York, undertook the preparation of an authoritative map of the crest of the falls, and employed for that purpose E. L. Blackwell, a civil engineer. The work was completed in the autumn of 1842, at which time a series of monuments were established at the principal trigonometric points. The map was

1907
Gilbert

published the following year,[1] together with descriptions of the monuments and a table of compass bearings from the various trigonometric points to objects whose positions were determined by the method of intersection. It was the purpose of this survey to make definite record of the existing position of the crest line and connect this record with permanent monuments, so that by means of a similar survey at some future time the extent of changes might be determined. This purpose it has served. Monuments then placed have been used as starting points in subsequent surveys, and two of them are still extant.

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In 1875 the second survey of the crest line was made by the United States Lake Survey under the direction of Maj. C. B. Comstock, the field work being done by F. M. Towar. The United States Geological Survey undertook the third survey, which was made by Robert S. Woodward in 1886. The fourth survey was made in 1890, by A. S. Kibbe, under the direction of John Bogart, State Engineer of New York, and a very full report was published. In this report the maps of the three preceding surveys are republished, and the crest lines given by those surveys are also placed on the new map. The fifth survey was made in the spring of 1905, by the United States Geological Survey and the State Engineer of New York, the work being done by W. Carvel Hall, and his report follows this paper.

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The Horseshoe Fall.

The Horseshoe Fall is at the head of the gorge. From its edges the walls of the gorge run northeastward approximately parallel. The American Fall is at the side of the gorge, 2,500 feet from its head, and is separated from the Horseshoe Fall by Goat Island. A few hundred years ago the two falls were together, the position of the united cataract being somewhere in

[1] Nat. Hist. New York, pt. 4, Geology, 1843. Opp. p. 402.

NIAGARA

Painted by F. E. Church, 1857. In the Corcoran Art Gallery, Washington, D. C.

the neighborhood of the present American Fall. The subsequent retreat of the Horseshoe Fall has had the effect of lengthening the gorge, but the American Fall has not in the same time made an alcove in the side of the gorge. With reference therefore to the question of the age of the gorge, it is the Horseshoe Fall whose rate of recession is important. 1907 Gilbert

The chief data for the estimation of the rate of recession are the maps of 1842 and 1905, the time interval being sixty-three years. The outlines from these maps are shown in fig. 4. These data, like other statistical data, can be discussed in a variety of ways and made to yield widely divergent results — a fact sufficiently illustrated by earlier estimates of the rate of recession based on comparisons of the map of 1842 with that of 1875, 1886 or 1890. The following paragraphs therefore set forth somewhat fully the methods here used, with the principal considerations on which they are based.

In the lengthening of the gorge the river does its principal work in that part of the Horseshoe curve where the current is deepest. The agitation of the plunging water is there so powerful as to roll about the fallen blocks of limestone, using them as tools to grind the shale, and at the same time breaking them up and eventually washing them downstream. The scour maintains a deep hollow beneath this part of the fall, a hollow whose depth is greater than the height of the fall. . . . At the sides of the channel, especially near the right bank, where the sheet of falling water is comparatively thin, the fallen blocks are not cleared away, but cumber the base of the cliff. . . . As the cataract retreats, it leaves behind it a deep channel, or elongated pool, in which the current is slow. Below the cataract the gorge is widened at top by the falling away of its banks. When the shale is exposed to the air it becomes subject to frost action, and for a time the limestone ledge above continues to be undermined, but a practical limit is reached as soon as the talus of fallen material covers the slopes of shale, and thereafter the change is exceedingly slow. The real lengthening of the gorge is along

1907
Gilbert

that portion of the Horseshoe where the sheet of falling water is heavy enough to clear away the debris and maintain a deep pool. The retreat of the cliff on either side of this portion is secondary, and appears to have little or no bearing on the question of the rate at which the gorge is growing longer. I have therefore restricted attention to the central part of the Horseshoe curve.

As the two crest lines compared are irregular in outline, a certain confusion arises if the recession of different parts is considered separately. At one place the recession seems to have one direction, at another place to have another direction, and various complications ensue when attempt is made to combine measurements made in different directions. In view of this difficulty it has appeared to me both convenient and legitimate to assume some one direction as the general direction of recession and at all points measure the amount of recession on lines parallel to that direction. From an inspection of the crest lines as wholes and in their relation to each other I have inferred such a general direction of recession, and assuming it to apply to the entire central tract of the Horseshoe, have drawn the system of parallel lines seen in fig. 4. There are six of these lines, each extending from the crest line of 1842 to that of 1905. Their interspaces, according to the scale of the map, are 100 feet wide. The average length of these lines represents approximately the average recession of the cataract in the part where the sheet of falling water is heaviest. Their lengths are, severally, 430, 292, 260, 276, 317 and 412 feet, giving an average length of 331 feet. Their distance divided by the number of years, 63, gives as the average annual recession 5.3 feet. . . .

The indication is that during the thirty years following 1875 the lengthening of the gorge went on at a somewhat faster rate than during a similar period preceding that date. While it is quite possible that the apparent variation in the rate is sufficiently accounted for by the irregularity of the breaking away of the limestone sill, it is also possible that the rate has been influenced by a special condition affecting the mode of recession. A change

in the outline of the fall which was mentioned nearly a century ago as diminishing its resemblance to a horseshoe consisted in the development of an angle near the head of the curve and on the side toward Goat Island. . . . Within the last thirty years the recession has been especially rapid in that angle, and there has developed a deep recess or notch. This appears to have been occasioned by a local weakness of the limestone, presumably its subdivision by a belt of vertical joints. Within the notch the mode of recession has been so far modified that the upper layers of limestone have been removed before the lower, so that at certain stages of the process the water after falling from the crest has been caught by a shelf. The configuration can be better understood by an examination of Pl. I (p. 41) which is based on a photograph made in or near the year 1886. Whatever the method of erosion in the notch, it appears to be superadded to the general erosion by undermining, and an acceleration of the rate may plausibly be ascribed to it.

1907 Gilbert

If we regard the general method of recession by the process of sapping or undermining as normal, and the influence of joint systems as exceptional and temporary, the rate of recession computed for the period from 1842 to 1875 should be accepted as normal and the best available for use in geologic computations; but this involves the assumption that the limestone ledge was not affected in other parts of the gorge by belts of weakness similar to the one which has been exposed during the last few decades. It seems to me better, on the whole, to assume that the limestone eroded between 1842 and 1905 is fairly representative, so far as strength is concerned, of all that portion of the limestone ledge in which the cataract has done its work.

The maps of 1842 and 1905 represent the earliest and latest surveys, but do not include quite all the data worthy of consideration in this connection. A sketch by Basil Hall, made with the aid of a camera lucida, in 1827, has a claim for accuracy by no means to be disregarded. In the use of the camera lucida

1907
Gilbert

the draftsman sees the landscape as though faintly pictured on a sheet of paper, and at the same time sees the pencil with which he traces its outlines. Before photography this method was the most accurate known for recording the outlines of a landscape, and in skillful hands it gives results of notable precision. There is much internal evidence that Captain Hall's sketches at Niagara were made with care and fidelity, and in view of these facts I have thought it worth while to endeavor to combine his record with the records by mapping.

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The American Fall.

The recession of the American Fall is much slower than that of the Horseshoe. The sheet of water on its brink is comparatively thin, and the force the water acquires in falling is not sufficient to remove the larger of the limestone blocks broken from the ledge above. The blocks are therefore heaped at the base of the cliff and serve as a natural riprap to protect the shale against wear. (See Pl. XI, p. 62, and fig. 8, p. 62.) Since the Horseshoe Fall parted from the American, leaving it stranded at the side of the gorge, there has evidently been some falling away of the crest of the American Fall, else there would be no limestone blocks at its base. But as the talus increases in height it becomes more and more protective, and the rate of recession should theoretically diminish.

It has already been observed that the geologist's interest in the rate of recession applies primarily to the Horseshoe Fall, because the work of that fall makes the gorge longer. If the conditions of erosion had been uniform during the whole period of the excavation of the gorge the work of the American Fall would have little bearing on its time estimates, but the volume of the river has not always been so great as at present, and there were two epochs in the history of the gorge when the volume was very small. During those epochs the discharge of the whole river was probably not much greater than the present discharge

through the American channel, so that the conditions affecting erosion were somewhat similar to those illustrated by the American Fall. For this reason it is worth while to inquire at what rate the American Fall has receded since the first precise observations on its position and contour. 1907 Gilbert

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There is good reason to question the accuracy of the map of 1842, especially in the vicinity of the northern shore. The area there indicated outside the line of 1875 and later maps is 110 feet broad. As its position is close to Prospect Point, which has been a popular view point through the entire period under consideration, the falling away of such a body of rock, either gradually or all at once, could not have escaped notice, but (so far as my reading goes) current literature, including the literature of the guide-books, is silent in regard to it. In addition to this negative evidence, there is positive information in the Basil Hall sketches. Comparing his sketch from Goat Island (Pl. V) with my photograph made from approximately the same point in 1895 (Pl. VI), it will be seen that there is essential correspondence in the distant headlands along the river. By means of these headlands I was enabled not only to establish a definite relation between the two views, but also to correlate the sketch of 1827 with the map of the gorge made in 1875, and by the aid of that map with the various charts of the crest line. . . .

As the Basil Hall sketches have thus served to discredit a portion of the map of 1842, it is in order to inquire whether they afford a substitute for the evidence ruled out. Once more using the vesta down the gorge as the basis of correlation, and applying measurement to points recognized as identical, I have ascertained that the sketch of 1827 and the photograph of 1895 give to the extreme salient of the American Fall almost identically the same position. At that particular point the recession appears to be zero. Nearer than the salient, and appearing about one-fourth inch to the right of it, is a peculiar configuration of the crest line which seems to be common to the two views. In the photograph

1907
Gilbert

a dark wedge projects obliquely downward and toward the left, interrupting the body of white. In the sketch its position is occupied by a sweeping curve, less angular than the other lines representing the turn of the water. Making proper allowance for the fact that the water was unusually low in the summer of 1895, I think it quite possible that these features of the two pictures represent the same local and peculiar configuration of the rock of the crest, and the suggestion they give is that there has been no change whatever in the crest line of that portion of the American Fall since 1827.

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The matter can be approached in another way. The distance through which the Horseshoe Fall has retreated since it parted from the American Fall is about 2,500 feet. Allowing five feet per annum as the rate of recession, the parting took place about five hundred years ago. The condition of the American Fall at the time of separation may be inferred in a general way from an examination of the eastern part of the Horseshoe Fall at the present time (Pl. X). From Goat Island to a point about 500 feet westward the water is shallow, corresponding in average depth to that of the American Fall. Beyond that point it is comparatively deep. In the region of deep water the recession of the cataract is rapid, and the portion with shallow water is being left behind. At the base of that part of the fall where the water is shallow the descending stream does not plunge into the pool, but strikes a talus of rock fragments. These fragments are in part visible, and their existence is elsewhere inferred from the forms given to the spray by the reaction. It seems to me legitimate to infer that the American Fall at the time of its abandonment by the Horseshoe was not so advanced in position as to plunge into standing water, but had already retreated far enough to have acquired a talus above the level of the pool. At the present time the profile of the American Fall where its volume of water is greatest is approximately as shown in fig. 8. The edge of the main river is at S, 220 feet horizontally from the

crest of the fall at C, the intervening space being occupied by a gently sloping talus of large limestone blocks, among which the water descends in a labyrinth of cascading torrents (Pl. XI). At the initial stage, when the American Fall was first separated, the position of its crest was probably at some point (I) between its present position and the outer edge of the visible talus. As sketched, I is 160 feet from C, and if the total retreat of the American Fall in five hundred years was 160 feet the average rate of recession was 0.32 foot per annum. Allowance should be made for difference in rate dependent on the gradual encroachment of the protective talus upon the exposed cliff of shale, so that during the earlier part of the period the retreat was more rapid than during the later part. The indication, therefore, is that the present rate of recession is considerably less than 0.32 foot per annum, a result in harmony with that based on the maps and sketches. 1907 Gilbert

The assumptions underlying each of the estimates are factors of such importance that neither result can claim a high measure of precision. It appears to be safe to say that the present average rate of recession of the American Fall can not be so great as 0.5 foot per annum, and is probably as small as 0.2 foot per annum, or about one twenty-fifth of the rate of recession of the Horseshoe Fall.

The Map of 1842.

The detection of an important error in the outline of the American Fall as mapped in 1842 tends naturally to bring into question all other results of the survey of that year. Inasmuch as the outline of the Horseshoe Fall as determined in 1842 is one of the most important data used in the computation of the rate of recession, it has been subjected to critical examination and all practicable checks have been applied.

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The factors bearing on the estimate of the rate of recession are not so related that rigid mathematical methods can be applied to their discussion. The conflict of data and the mutual support

1907
Gilbert

of data can be weighed only by nonmathematical methods, and the result of their study is an opinion rather than a decision. The general tenor of the evidence, including the five surveys and the Basil Hall sketch, leaves no question that the annual rate of recession has been about four or five feet. If full authority be ascribed to the map of 1842, the estimated annual rate of recession is 5.3 feet. If full authority be ascribed to the tangent line based on the sketch of 1827, the estimated rate is about one foot less. It is my opinion that the map affords the better record. Giving to it the greater weight and to the tangent a smaller weight, I think the best practicable estimate of the rate is between 5.3 and 4.2 feet, but nearer to the former; and I select five feet partly because a statement in even feet avoids the implication of high precision which might be suggested by a decimal. As an estimate of the average rate of recession during the period of definite observation, I think this can not be in error more than one foot.

Summary and Conclusion.

The data for computing the rate of recession of Niagara Falls include surveys of the crest line made in 1842, 1875, 1886, 1890 and 1905, and camera lucida sketches made in 1827. During the period covered by these data the local conditions affecting the rate of recession have not differed to an important extent from the natural conditions. The present and prospective diversions of water for economic uses interfere with the course of nature and may be expected to modify the rate of recession. The natural rate of recession of the Horseshoe Fall is desired by geologists in connection with estimates of the age of the river. The geologic bearing of a rate modified by human agency is less direct. The rate of recession of the American Fall is of interest to geologists because somewhat representative of the river's activity in gorge making when the volume of water was much less.

The rate of recession of the Horseshoe Fall, or the rate of lengthening of the Niagara gorge, during the sixty-three years

from 1842 to 1905 is found to be five feet per annum, with an uncertainty of one foot. For the thirty-three years from 1842 to 1875 the rate was apparently slower than for the thirty years from 1875 to 1905. The rate of recession of the American Fall during the seventy-eight years from 1827 to 1905 was less than three inches per annum. 1907 Gilbert

The time consumed in the recession of the falls from the escarpment at Lewiston to their present position, or the age of the river, is not here estimated. It can not properly be computed without taking account of all conditions, local and temporary, affecting the rate of recession, and some of those conditions have varied greatly from point to point and from time to time.

GILBERT, GROVE KARL. The rate of recession of Niagara Falls — I. (Sci. Am. sup., Apr. 20, 1907. 62:26157–26160.)

GILBERT, GROVE KARL. The rate of recession of Niagara Falls — II. (Sci. Am. sup., Apr. 27, 1907. 63:26179–26183.)

These articles also appear in the Annual Report of the Commissioners of the State Reservation at Niagara Falls.

[Review of Gilbert's "Rate of recession of Niagara Falls."] (Eng. news, Feb. 28, 1907. 57:248.) 1907

The rate of recession of Niagara Falls is reported on in a recent bulletin of the U. S. Geological Survey by G. K. Gilbert. Surveys to determine the outline of the crest of the falls of Niagara were made in 1842, 1875, 1886, 1890 and 1905. The last was made specifically to furnish accurate data on the recession or wearing of the falls; it was thought that the increasing abstraction of water for power generation will soon modify the rate of erosive recession, so that data as to the *natural* rate, which is of high importance to geologists, can not be calculated from future surveys. The author deduces a mean rate of 5.3 ft. per year for the Horseshoe Fall, and a mean rate of 0.2 to 0.5 ft. for the American Fall. Besides the records of the surveys above noted, several camera-lucida sketches made in 1827 by Capt. Basil Hall, are available. These, with other data, served

1907 to show that the 1842 map is badly in error as to the American Fall, but probably correct as to the Horseshoe. A perusal of the pamphlet brings out nothing more clearly to the engineer than that the various surveys disagree to a remarkable extent. Equally remarkable is the fact that the 1905 survey, which doubtless was intended to be better than the previous ones, was made with a plane-table, giving no numerical record, but only a map-plot, of the results. This survey is separately reported, in the same bulletin (Bulletin No. 306), by W. Carvel Hall.

1907 Spencer

SPENCER, JOSEPH WILLIAM WINTHROP. Falls of Niagara: their evolution and varying relations to the Great Lakes; characteristics of the power and the effects of its diversion. (Can. dep't of mines, geol. survey branch. Ottawa: S. E. Dawson. 1907.)

This monograph on the geology and physics of the Falls of Niagara gives in detail the scientific results of the survey made by Mr. Spencer in 1906, with many references to the conclusions of other geologists regarding Niagara.

Niagara and its history are so familiar that most people naturally conclude that almost everything concerning the Falls has already been made known, so that additional work suggests little more than a re-description or essay writing. Among the various contributions to the literature, only a few, in number, bear upon the geological aspect, and fewer still have made additions to our knowledge of the subject. Yet such contributions, as will be seen from many necessary discoveries announced in this book, formed chapters too incomplete upon which to establish the science of the Falls. This statement applies not only to their geological, but also to their physical, aspect. Thus, while the volume of the river had been measured for power purposes, some of the most important problems in its physics had not been elucidated by the engineer — not merely those bearing on the future of the Falls, but even that of the mean discharge given. The recession of the Falls through the different strata is the ordinary limit of research required of the geologist. But the changes, in the volume and currents of the river, in the height

of the Falls, and in the effects of the buried valleys, determined by causes acting far from the great cataract, opened a new field of investigation, as did also the application of more precise methods of research than were formerly followed, so that the Falls of Niagara have given rise to a chapter in science, belonging entirely to themselves, which had not hitherto been understood, and which could not have been interpreted by any outside standard. 1907 Spencer

Four surveys of the crest-line of the receding Falls had been made, with considerable intervals between them. The last published one was made in 1890; but none had been undertaken by Canadian authorities. As the diversion of power at Niagara was attracting attention, and as such would change the recession, Dr. Robert Bell, Acting Deputy Minister and Director of the Geological Survey of Canada, saw the necessity for prompt action, as the operations in progress were tending to alter the natural conditions, so that the last opportunity was passing by. Moreover, observations made by the engineers of the power companies might be of value, which would be lost when these corps should be disbanded.

Under these conditions, and finding that I had already commenced such a work, on my own account, by a survey of the crest-line, in October, 1904, Dr. Bell commissioned me to prepare a " complete monograph " upon the science of the Falls, as he had been aware of my previous contributions to the subject. These had already been published in a report of the Hon. Andrew H. Green. . . .

. . . In this connection, it may be said that I represented Mr. Green in some of his negotiations with the late Secretary Hay, who also was much interested in Niagara Falls. Indeed, Mr. Green was especially desirous that I should make just such a survey as has now been carried out under Dr. Bell.

. . . . .

The commission was commenced in June, 1905, and the field work was carried on till February, 1906. This was due to the

1907
Spencer

mild winter, for even on January 25, 1906, the farmers were ploughing. After having the report well advanced, its complex character demanded a revision in the field, to which I returned for several weeks, leaving it on October 26, 1906.

The new investigations under the survey were by:— (1) Soundings at all the changing points of the gorge, even under Niagara Falls themselves, and in the Whirlpool; (2) Borings to ascertain the character of the buried channel beds, over which the river afterwards flowed; (3) instrumental surveys of the old river banks and the position of the strata; (4) Investigations of lake fluctuations, based upon the daily records for fifty years, as to their bearing upon the stability of the earth's crust, the lowering of the lake outlets and of the lakes themselves, and as to new results of the discharges of the rivers — all of these modified by (5) Meteorological changes. The future effects on Niagara Falls and upper lakes by the diversion of the water of the Falls have been ascertained. The recession of the Falls, from their birth to the present day and for the future, has been determined, as well as their age. The existence of an ancient Erie outlet some miles to the west, not hitherto suspected, is a most important discovery in the history of the changes in the lake region. The International Boundary Line, showing the greater Falls to be in Canada, has been laid down on the map.

Besides the other scientific results, features bearing on international questions have arisen in connection with the effects of the drainage of the Falls at the International Boundary, and the lowering of the lakes by power diversions, as also the ownership of the water rights of Niagara Falls. Even the establishment of the Boundary Line at the falls comes to be a geological question, and not merely one of ordinary surveying.— Preface.

SPENCER, JOSEPH WILLIAM WINTHROP. Recession of the Niagara Falls. (Brit. Assn. for A. S. Report 77th meeting. 1908. Pp. 572–573.) [Abstract.]

The paper from which this abstract is taken was read before the society in August, 1907, and gives the results of researches and observations of

the author on the rate of recession of the Falls. The same abstract is published in the Geological magazine, decade 5, 1907. 4:440–441. 1907 Spencer

SPENCER, JOSEPH WILLIAM WINTHROP. Recession of the Niagara Falls. (Geol. mag. Decade 5. 1907. 4:440–441.)

1908

FARIS, R. L. Digest of paper by Spencer on "Soundings under Niagara Falls and in gorge" later published in his "Evolution of Falls of Niagara." (Sci., Apr. 10, 1908. 27:587–589.) 1908 Faris

GILBERT, GROVE KARL. Evolution of Niagara Falls. Review of Spencer's book. (Sci., July 31, 1908. 28:148–151.) 1908 Gilbert

GREGORY, J. W. Niagara as a geological chronometer. (Nature, Nov. 5, 1908. 79:11–12.) 1908 Gregory

A sympathetic review of Spencer's monograph on "The Falls of Niagara: their evolution and varying relations to the Great Lakes."

HULBERT, ARCHER BUTLER. The Niagara River. N. Y. and Lond.: G. P. Putnam's Sons. 1908. 1908 Hulbert

In the endeavour to gather into one volume a proper description of the various interests that centre in and around the Niagara River the author of this book felt very sincerely the difficulties of the task before him. As the geologic wonder of a continent and the commercial marvel of the present century, the Niagara River is one of the most remarkable streams in the world. In historic interest, too, it takes rank with any American river.—*Preface.*

CHAPTER III

THE BIRTH OF NIAGARA

Geologic time presents to the scientist one of the most difficult problems with which he has to deal. When the different divisions into which he would divide the ages are numbered by thousands and even millions of years, the human mind is appalled at the prospect; and when the calculations of different geologists vary by hundreds of thousands of years, the lay mind cannot help growing somewhat credulous, and at times be tempted to discard the whole mass of scientific data relating to the subject.

1908
Hulbert

Niagara River forms one of the best, if not the best, means of studying the lapse of time since the Ice Age. Finding, as students do here, the best material in existence for this study, leads to exhaustive scientific analysis of every clue presented by the Cataract and the deep Gorge it has cut for itself through the solid lime rock and Niagara shale forming its bed.

We are prone to look upon the great wonders of the world as destined to last as long as the earth itself. We do not realize that the mountains, miles in height, are slowly crumbling before our eyes, or realize that the rivers are carrying them slowly toward the sea, filling the lakes and lower portions of land along their courses. These slow but ceaseless forces are continually at work, reducing the surface of the earth to that of a level plain and at the same time depriving the land of its lakes by filling their depressions with silt. The winds and the waters, together with the wearing power effected by frost, are the forces struggling at this great leveling task. The work is partly done; in many of the older regions the lakes and elevations have almost entirely disappeared. Other parts of the land are comparatively new; and it is here that one sees the rough mountain or the deep canyon of the river; sufficient time not having elapsed to wear away the elevation in the one case nor the steep banks in the other.

One needs but to look at a relief map of the Niagara district to note the Falls and the outline of the Gorge to see at once that this is a comparatively new region or, at least, that the formative forces which gave it its present characteristics were at the highest stage of their career when the lands to the south had almost reached their present stage. These facts can be observed by any person visiting the Niagara district; it does not require a geologist to trace roughly their course.

Questions naturally arise in calculating the age of Niagara. If, as all the facts seem to indicate, this river has had a very recent beginning, what then did it do before it occupied its present course? What will be its final destiny? What will happen when it has worn its Gorge back to Lake Erie? Or will

the general level of the land be so changed that the Falls will never recede to the lake? The last and most important of all is: How long has it taken the Falls to grind out the Gorge thus far? This latter question, viewed in its relation to the first one, forms the basis of the present chapter. The great work of the Cataract is going on before our very eyes. The history of this great river is working itself out at the height of its glory, in an age when all can behold. It is the more interesting since it is the only example of the kind known. One can easily look back to the time when the water flowed along the top of the plateau to Lewiston and the Falls were situated at that point. This date, of course, witnessed the birth of Niagara, for, wherever the waters flowed before, they could not have taken this course before the Falls began their work. The day that witnessed the beginning of the one witnessed also the birth of the other. Likewise one cannot help looking forward to the day when Niagara shall have accomplished its work, when its waters shall have completely ground the plateau in two, and so drained Lake Erie to its bottom. 1908 Hulbert

What did the waters of the lakes do before the Niagara began its history? How long has it been at its present work? These are the questions interesting to every one; and by far more interesting to one who is making a study of the formative forces now contributing, and which have contributed to bring about the present characteristics of surface structure. A few important facts exist, and these now are beyond doubt, upon which rest the inferences concerning the age of the Falls. In ancient times the waters of Lake Erie did not find an outlet through Niagara River, so there was no channel ready made for the river when it began its present course. Even after the beginning of the river the upper lakes, Huron, Michigan and Superior, did not discharge their waters through Niagara. Until comparatively recent times only the waters from Lake Erie discharged through this channel and therefore for many ages only a small fraction of the present volume could possibly have been at work on the Falls.

1908
Hulbert

The striking features of the Gorge are modern, and have been very little affected by those agencies which are continually moulding the contours of land surfaces. The inclination of the river's bed has varied greatly with the ages, due to gradual uplifting or depressing of the earth's crust; consequently the current has varied greatly in velocity with these changes. A calculation of the work done by the river during each epoch of its history is indeed fraught with many difficulties. Much investigation, however, has been made along this line and with a rather satisfactory degree of success.

Niagara appears to have had a life peculiar to itself; but what is unique in its history, is the presentation of characteristics which in the case of other rivers have long since passed away. Rivers, and especially very large ones, appeal to us as "unchangeable as the hills themselves;" but the truth is, that the very hills and mountains are changing as a result of the forces exerted by water. Niagara, as viewed by the geologist, is unique, not on account of its having a different history than any other river, but for the reason that it had a more recent beginning. The calculation of the life of such a stream is interesting in itself, besides the other great questions settled by the solution of such a problem as the probable number of years that the river shall exist in its present form, the centuries which have elapsed since the ice retreated from this region, and the ascertaining of certain facts concerning the antiquity of man. In order to make a thorough study of these topics, one must take a view of the relief features of the Niagara region, and make a careful review of what conditions existed at the time that this district was covered by the great ice sheet, together with the changes effected during the retreat of the Great Glacier to the north.

Niagara River has its origin in the eastern end of Lake Erie, about three hundred feet higher than the surface of Lake Ontario. Passing from Erie to the last-mentioned lake the descent is not gradual, but one finds a gently rolling plain with almost no slope for nineteen miles until almost at the very shore of Lake

Ontario, where almost unexpectedly one comes upon a high precipice from which a magnificent view of the lower lake may be gained, only a narrow strip of beach intervening. This cliff is called by geologists the Niagara escarpment. 1908 Hulbert

When the river leaves Lake Erie its waters are interfered with by a low ledge of rock running across its channel. After passing this its waters meet no more troublesome obstructions until coming to the head of Goat Island. The river can scarcely be said to have a valley. One is reminded more of an arm of the lake extending out over this region. The country from Lake Erie to near the head of the Rapids above the Falls rests on a stratum of soft rock; from the Falls northward the underlying stratum is formed by a ledge of hard limestone, and beneath this a shale and two thin strata of sandstone. By the descent of the Rapids and the Falls, the waters are dropped two hundred feet, and thence through the Gorge they rush along at an appalling rate over the descent, through the Whirlpool and on to Queenston for a distance of seven miles. From this city to the lake there is little fall and so only a moderate current.

The deep, narrow gorge extending from the Falls to Lewiston is the especial subject of study to the geologist. This canyon is scarcely a quarter of a mile wide, varying little in the distance from cliff to cliff throughout most of its course. This chasm opens up before the student with almost appalling suddenness, while travelling over an otherwise regular plain. Its walls are so precipitous that few opportunities are offered for scaling them; and their height from the bottom of the river varies from two hundred to five hundred feet. An examination of both sides of the Gorge shows the same order in the layers of rock and shale on comparatively the same level, with the same thickness of each corresponding stratum. If a superstitious person had come unexpectedly upon this gigantic fissure ages ago, he might easily have imagined it to have been the work of some mighty mythological hero; but the modern scientist has reached a much better, as well as a much more satisfactory conclusion, namely, that this immense

1908
Hulbert

cleft has been sawed by the force of the water, from a structure whose features were continuous, as is manifest by the similarity of the exposed strata on the two sides of the stream. To be convinced of the fact that the Falls are gradually receding, it is only necessary to observe them closely for a few years. The breaking away of an immense mass of rock previously described is one of the recent events in the history of the river. This establishes the fact that the Gorge is growing longer from its northern end through the agency of the waterfall.

These facts show us the river working at a monstrous task. Its work is only partly done. Two questions come to us almost immediately: When this work is done what will it do? and, What did it do before its present work begun? The waters of Lake Erie could never have flowed to Lake Ontario without wearing away at the Gorge we now see. The birth of the river and the cutting of the canyon were simultaneous. Of this much we are assured.

A superficial study of a map of North America will show at once a great difference in the northern and the southern sections. From the region of the Great Lakes northward the district is one continuation of lakes, ponds, swamps and rivers with many rapids. South of the Ohio there are few lakes, and the rivers flow on with almost unbroken courses. Here is a region much older than that to the north; and its waters have had ages more in which to mould down elevations and fill up depressions. The cause of this difference in the characteristics of the streams of the North and those of the South is to be explained by the great Ice Age. As far as we now know there may have been little difference in relief forms between the two sections before the encroachment of the ice. During the glacial epoch the whole northern part of the continent was covered with a thick ice sheet, which was continually renewed at the north, and as continually drifted slowly in a general southerly direction. As this heavy ice cap passed over the surface, it acted somewhat like a river in its erosive power, only working much greater changes. It not only

picked up loose particles, but also scoured and wore away solid rocks along its bed. Thus the whole configuration of the country was changed. 1908 Hulbert

At the southern terminal of the glacier, where it ended in the ocean, the ice broke away in large bergs, as in the northern seas to-day; but where the advancing ice met the warmer climate on land, it was melted and thus deposited at its terminal all the material it carried. The eroding power of this ice sheet, together with the deposit of its materials on melting, brought about a great change in the configuration of the country. Many old valleys were obliterated, while a number of new ones were carved. As the ice retreated northward with the change of climate, new lakes and rivers were formed. Many times the streams escaping from the lower level of lakes were forced to find an entirely new course, and so to carve a new channel of their own. The region of the Great Lakes and the Niagara River is no exception to this rule; and it is with the ending of the Ice Age that the history of the river begins.

A glance at a map shows a low range of hills or rather a gentle swell in the land surface forming the watershed between the lakes and the streams flowing to the south. At the time of the farthest southerly extension of the glacier it reached beyond this elevation; and its waters were discharged into the rivers flowing to the south. When the southern terminal had retreated to the north of this divide, but still blocked all outlet to the north or east, there was doubtless a number of lakes here discharging their waters across the present low watershed to the south. Some of these ancient valleys can still be traced for long distances of their course. These lakes passed through their varying history as those of to-day, their surface troubled by wind and storm and their waves leaving indelible carvings upon their shores.

One of these lakes occupied what is now the western end of Lake Erie, shortly after the ice front had passed to the north of the watershed mentioned. There are still very definite mark-

1908
Hulbert

ings which show that its waters were discharged across the divide by a channel into the present Wabash River and thence into the Ohio. This channel can be traced throughout most of its course very easily. There are at least four distinct shore lines preserved to us, which show four successive levels of the lake as it reached lower outlets before the Niagara River was born. All of these old shore lines can be traced throughout most of their courses.

As the ice continued to retreat, next we notice the greatest change in the elevation of the surface of the water. The ice front finally passed to the north of the present Mohawk River, thus allowing the waters to escape by that outlet, and, as a consequence, lowering the surface of the lakes by over five hundred feet. This drained a great extent of land and dropped the surface of Ontario far below the present level of the Niagara escarpment. Then for the first time the Niagara began to flow, and its Falls began their work. Immediately upon the formation of this new, lower lake it began the work of leaving its history carved upon the rocks, sands, and gravels which formed its shores. Its first ancient beach is more easily traced for almost its entire course than any of the other old levels. It does not even take the trained eye of the scientist to see its unmistakable history written in the sands. The earliest western travellers describe the Ridge Road running along this old, deserted beach as showing unmistakable signs of having been an ancient shore line of the lake.

In following the course of this old shore line a gradual slope is noticed, and if this was a shore line, we must account for this variation in elevation, since the surface of the water is always level. The explanation is to be found in the fact that portions of the earth's surface are gradually rising while others are as gradually sinking. On comparing the old coast line with the level of the present one, we find that the lake has gradually inclined to the south and the west. This change in elevation had its share in determining the configuration of the lake as well as

the relief features of the surrounding region. The point of discharge was at Rome, New York, as long as the barrier blocked the regions north of the Adirondack Mountains. As soon as the encroaching warmth of the south had removed this barrier to the level of the Rome outlet, the water began flowing by the St. Lawrence course. True the first outlet was not the same as the present one; but it must have been many times shifted in the course of the retreat of the ice. As a result of this alternate shifting, together with the changing of the level of the lake, there are to be found the markings of numerous shore lines, some of which pass under the present level of the waters. 1908 Hulbert

These different variations must of necessity have had a great effect on the work of Niagara River. When the Niagara began to flow, instead of its terminal being nearly seven miles from the escarpment, it was only between one and two miles away, and the surface of the lake was about seventy-five feet higher than now. While the outlet remained at Rome, the eastern end of the lake was continually rising, which caused the waters at the western end to rise over one hundred feet. This placed the shore of Ontario almost at the foot of the beautiful cliff at Queenston and Lewiston. After having occupied this position for a long period, the surface of the waters again fell over two hundred feet, carving an old shore line which is now submerged. After this, various changes of level in the land and shiftings of the ice barrier caused numerous old shore lines to be faintly carved. These changes continued until the present outlet was established and the waters began to flow along the present course of the St. Lawrence.

One might think that with these changes all the variable factors of our problem have been discussed; but these same factors also had their effect upon the upper lakes. In a study of the old markings of all the lakes of this region, it seems that the northern shores were continually rising; this, of course, points to an occupation of a more northerly position by the lakes than at present, and also a laying bare of northern parts, and shifting of waters south, or possibly both of these changes at once.

1908
Hulbert

In the most ancient system of which we can obtain an approximately definite knowledge, Lake Huron was not more than half its present size, while Georgian Bay formed the main body, connecting with Huron by a narrow strait. Michigan and Superior occupied about their present limits, but were connected with Huron by rivers rather than short straits; Erie occupied only a fraction of its present position, having no connection with Huron. The waters of the upper lakes were doubtless discharged from the eastern end of Georgian Bay, which then included Lake Nipissing, by way of the Ottawa River, into the St. Lawrence. Thus the Niagara was deprived of about seven-eighths of its present drainage area, and consequently was totally unlike its present self. There is some indication that there may have been an outlet from Georgian Bay by a more southerly route, namely, the Trent River. If this were so, the northern route must have been blocked by the ice, since the Trent Pass is much higher than the one leading from Lake Nipissing, by way of the Ottawa. These are some of the possibilities which must be taken into consideration before any sure calculation can be made as to the age of the Falls, for there must have been an epoch in the history of the river, were it short or long, during which it carried only a very small fraction of the waters which it bears at present.

Let us turn again to the gorge of the river itself. We have noted the similarity of structure of its two sides. This similarity is continuous throughout except at about half-way from Queenston to the Falls, where the river makes a turn in its course of almost ninety degrees. On the outside of this angle is the only place in the whole course where the material of the cliff changes. Here there is a break in the solid rock of the bank, which is filled with loose rock and gravel. This rift, to whatever it may be due, is of pre-glacial origin, for it is filled with the same material, the glacial drift, which covers the whole region. The cliff along Lake Ontario also presents very few breaks; but a few miles to the west of Queenston at St. Davids a broad gap is found in the otherwise unbroken wall. This gap is also filled with glacial drift. On its first discovery it was supposed to be

a buried valley, and no connection with the Whirlpool was attributed to it. Later it was supposed that the break in the side of the Gorge, and the one at St. Davids, were parts of one and the same course of some pre-glacial stream. This supposition has been proven by the course having been traced through most of its distance by the wells sunk in the region. Later this interpretation of the facts found was destined to furnish further explanations. The question at once arose: How far and where did the upper course of this ancient valley extend? If it had cut across the course of the modern river, there would have been a break in the continuity of the cliff somewhere on the opposite side of the Gorge; but this can nowhere be found to be the case. The upper course of this ancient channel, therefore, must have coincided with that of the present channel. When, then, the Falls had receded to the side of the present Whirlpool, it reached a point where the greater part of its work had been performed. From here to whatever distance the upper course of the ancient river extended, the only work to do was to remove the loose gravel and boulders with which the glacier had filled its channel. This, of course, was effected much more rapidly than the wearing away of the hard limestone bed. Just what was the depth, and how far this old deserted valley extended, it is almost impossible to estimate. These changes are some of the most potent with which one must reckon in any calculation of the time since the beginning of Niagara's history. However, some work has been done in this line; and a broad field is still open for future investigation.

1908 Hulbert

SPENCER, JOSEPH WILLIAM WINTHROP. Changes in the recession of the Falls of Niagara. (Science n.s., Sept. 18, 1908. 28:383–384.)

1908 Spencer

"A mere summary of some of many chapters required in describing phenomena which bring to light the changing features of Niagara Falls."

SPENCER, JOSEPH WILLIAM WINTHROP. Revision of the age of Niagara Falls. (Science n. s., June 12, 1908. 27:925–926.)

Resumé of paper read at the Geological Society of Washington, April 8, 1908.

1908
Spencer

SPENCER, JOSEPH WILLIAM WINTHROP. Side issues bearing on the age of Niagara Falls. (Sci., Nov. 27, 1908. 28(n. s.):754–759.)

Spencer's answer to Gilbert's review of Spencer's "Evolution of Niagara Falls" in *Science*, July 31, 1908.

SPENCER, JOSEPH WILLIAM WINTHROP. Soundings in Niagara gorge and under the falls. (Sci. Am., Aug. 1, 1908. 99:76–77.)

The results obtained were made by the special application of sounding methods "to determine what work the Falls of Niagara had accomplished at each point in their recession."

These results show that the narrow channel was formed when the level of Lake Ontario was about 180 feet lower than now, at the time when the Niagara was draining only the Erie basin and not the four upper Great Lakes. They show that the Falls were once very much higher than now, and that the last cataract of the three which composed them was alone over 300 feet high, and the whole aggregated over 500 feet.

The soundings also complete the proof that the Falls were located just above Foster Flats, or about three miles within the end of the gorge, when the volume of the Niagara was vastly augmented, owing to the addition of the waters from the three highest lakes, which now took place. Again the soundings at the Falls bring to light the fact that the modern cataract is not so high as it was a few hundred years ago, before the completion of the Whirlpool Rapids.

SPENCER, JOSEPH WILLIAM WINTHROP. Soundings under Niagara Falls and in the gorge. (Science n. s., April 10, 1908. 27:587–589.)

A resumé of a paper read at the Philosophical Society of Washington, March 14, 1908. It gives a description of the application of sounding methods to an unusual subject, by which the physical features of the gorge were brought to light, thus determining what work the Falls of Niagara had accomplished at each point in their recession. "The soundings also complete the proof that the falls were located just above Foster Flats, or about three miles within the end of the gorge, when the volume of the

Niagara was vastly augmented, owing to the addition of the waters from the three highest lakes, which now took place." **1908** Spencer

UPHAM, WARREN. Niagara as a measure of post-glacial time. (Rec. past, Sept. 1908. 7:244–246.) **1908** Upham

An excellent summary of Spencer's work. Mr. Upham believes that "the great continental ice sheets melted away between 10,000 and 5,000 years ago," while Spencer computes the period at 39,000 years.

WILLIS, BAILEY. Changes in the recession of the Falls of Niagara. (Science n. s., Sept. 18, 1908. 28:381–384.) **1908** Willis

Account by Bailey Willis of the July 1–3, 1908, meeting of the American Association for the Advancement of Science. This account includes a resumé of Spencer's paper on "Changes in the Recession of the Falls of Niagara."

WRIGHT, GEORGE FREDERICK. Chronology of the glacial epoch in North America. (Geol. Soc. of London. Quarterly jour. 1908. 64:149–151.) [Abstract.] **1908** Wright

The author estimates the age of the Niagara gorge to be less than 10,100 years.

1909

FAIRCHILD, HERMAN LEROY. Glacial waters in central New York. (N. Y. state museum. Albany: 1909. Bull. 127.) **1909** Fairchild

On pages 30–31 of this bulletin may be found an account of the "Birth of Niagara Falls and Lake Erie."

SPENCER, JOSEPH WILLIAM WINTHROP. Interruption in the flow of the Falls of Niagara in February, 1909. (Geol. Soc. of Am. bull. Aug. 10, 1910. 21:447–448.) **1909** Spencer

Read before the society December 29, 1909. Gives the causes of the interruption of the flow with an account of previous similar occurrences.

SPENCER, JOSEPH WILLIAM WINTHROP. Relative work of the two Falls of Niagara. (Geol. Soc. of Am. bull. Aug. 10, 1910. 21:441–446.)

This paper, read before the society December 29, 1909, deals with the "Rate of Recession of the American Fall and the Relative Efficiency of the Two Falls."

1910

1910 Spencer

SPENCER, JOSEPH WILLIAM WINTHROP. L'évolution des chutes du Niagara. (La Géographie. 5 Aout. 1910. tome 22, No. 2. Pp. 105–118.)

SPENCER, JOSEPH WILLIAM WINTHROP. On the relationship of Niagara river to the glacial world. (Science n. s., Aug. 5, 1910. 32:191.) [Abstract.]

Resumé of paper read at the annual meeting of the Geological Society of America, December, 1909.

SPENCER, JOSEPH WILLIAM WINTHROP. On the relative work of the two falls of Niagara. (Science n. s., Aug. 5, 1910. 32:187–188.)

A resumé of the paper read at the annual meeting of the Geological Society of America, December, 1909. The editorial comment states that it " Should be considered as an additional chapter to Spencer's ' Evolution of the Falls of Niagara,' wherein the work of the smaller cataract and the relative efficiency were scarcely considered."

SPENCER, JOSEPH WILLIAM WINTHROP. Partial drainage of Niagara river to the glacial period. (Science n. s., Aug. 5, 1910. 32:191.) [Abstract.]

Resumé of paper read at the annual meeting of the Geological Society of America, December, 1909.

SPENCER, JOSEPH WILLIAM WINTHROP. Relationship of Niagara river to the glacial period. (Geol. Soc. of Am. Bull., 1910. 21:433–440. Discussion, 21:763–764.)

This paper, read before the society December 29, 1910, deals with:
Studies of the Whirlpool — Saint David's Valley.
Features of the Whirlpool — Saint David's Gorge.
Pleistocene Deposits of Whirlpool — Saint David's Gorge.
Section of Drift in the Whirlpool — Saint David's Canyon.
Neighboring Drift Deposits.
Forest Glen and Older Epochs.

1911

1911 Wright

WRIGHT, GEORGE FREDERICK. The ice age in North America and its bearings upon the antiquity of man. 5th ed. Oberlin: Bibliotheca Sacra. 1911. Pp. 532–552.

Chapter 20, on the " Date of the Glacial Period," discusses the Niagara River at some length and in an interesting manner. In other parts of the book there is also material on the geology of the Great Lakes region. 1911 Wright

1912

Ontario-New York. Topographic map of the Niagara gorge. (U. S. geol. surv., G. O. Smith, Dir. *and* Geol. surv. of Can., R. W. Brock, Dir. 1913. 1:12,000.) 1912

"(Admirable large scale map of the whole Niagara gorge from above Niagara Falls to below Lewiston. The Falls themselves, the rapids above and the Whirlpool Rapids below are graphically rendered by means of hachures and fine lines in blue to represent eddies, supplemented by white areas in the general blue tint for water to represent foam and spray. The other elements are represented in the usual manner of the survey topographic sheets; but here again due to the large scale, the delineation of city areas (Niagara Falls, N. Y., and Ont., are both shown on the map) is especially valuable.)" This survey was made in 1912.

43° 11.0′; 43° 3.5′ N; 79° 5.5′ — 79° 1.8′ W. Interval 10 feet.

1913

Notice of map of Niagara gorge. (Am. Geog. Soc. N. Y. Bull. 45:849. Nov. 1913.) 1913

"A map of the Niagara River (1:12,000) from Lewiston to the mouth of the Welland River has been issued by the United States Geological Survey to accompany the recently published Niagara folio. This map was surveyed in co-operation by the United States and Canadian Geological Surveys. It was compiled originally to accompany Guide Book No. 4, entitled 'Excursions in south-western Ontario,' prepared by the Executive Committee of the Twelfth International Geological Congress."

Spencer, Joseph William Winthrop. Outline of the evolution of the Falls of Niagara; contrast with the falls of Zambesi; . . . Wash.: Press of Judd and Detweiler, inc. 1913. 1913 Spencer

This brief paper which was written for the " International Geological Congress," after discussing nature's work at the Falls says. . . . " In the future the Falls are destined to be destroyed by man."

Summary

The first fact impressed upon the reader of the geological bibliography of Niagara is the comparative youth of the science of geology, and the impediment which literal belief in the old biblical chronology and in the all-prevailing Noachian Deluge presented to its progress. When we observe that a writer in 1789 argued upon the theory that the world was only 5700 years old; that another, 98 years ago, in combating this prevalent notion, showed his courage as well as originality by declaring with "unhesitating certainty and coolness" that the world must have existed for more than 6000 years; and that only 82 years ago another geological writer of position firmly believed that Niagara was begun immediately subsequent to the restoration of order after the biblical deluge, we appreciate the handicap under which this science, dealing with the oldest things in the world's history, has labored until so recent a date as the life-time of living men.

The second and more conspicuous fact which appears from these writings is that from the beginning of the scientific inquiries into the geological history of Niagara to the present time, attention has been absorbed mainly by the question of the rate of the recession of the Falls. This has been due to a unique distinction of Niagara Falls and river, that here, more completely than at any other known place, are presented the criteria by which to estimate the period of years which has elapsed since glacial time. Scientists have felt that the determination of this period, if possible, would establish a unit by which not only earth history but human history also might be measured. These two fundamental questions — the age of the world and the age of man — rise instinctively in the human mind and call for answers; and geologists have been led by the fascination of this quest as irresistibly as explorers of five centuries ago were led to find a westward passage to Cathay or as explorers of recent years have been led to find the poles.

And, thirdly, appears the dual fact that in the past quarter of a century, great strides have been made in geological science,

notwithstanding which, the goal of certain knowledge about the age of Niagara has not yet been reached.

Very naturally, geological knowledge concerning Niagara has not developed in geological order. Recent and more obvious evidence has attracted first attention, while the remote and fundamental problems have received later consideration. Inquiries proceeding from effect to cause have led backward to antecedents and formative events, with the result that while many correct observations and valuable discoveries of existing facts have been made from time to time,— as, for instance, the drift-filled channel of St. David's or the submerged valleys of Lake Ontario — the original theories of the causes of these conditions have been upset by the later discoveries of other investigators. Thus it has been that pioneers who have been correct in their observations have been incorrect in their theories, and followers who possibly have had correct theories have benefited by the observations of their predecessors.

Many of the early observers of the physical phenomena of Niagara gave much attention to the formation of mists, rainbows, sound, the color of the water, the upward jets beneath the Falls, etc. Triangulation and surveys of the crest have proceeded with increasing accuracy since about 1838. The height of the Falls, stated by Father Hennepin in his amazement to be 600 feet, was ascertained with approximate accuracy as early as 1805 to be 158 feet, and in recent years has been fixed by the United States Geological Survey at 160 feet for the Horseshoe Fall. The volume of the river was a subject of speculation in 1805, when it was estimated at 3,000,000 tons. Another estimate at the same period was 400,000 tons as the weight of the mass between the crest and bottom of the Falls. In 1882, it was estimated that from 85,000,000 to 102,000,000 tons of water passed in an hour. But this branch of the subject merges into the hydraulic and industrial use of the Falls, which is discussed elsewhere in this work.